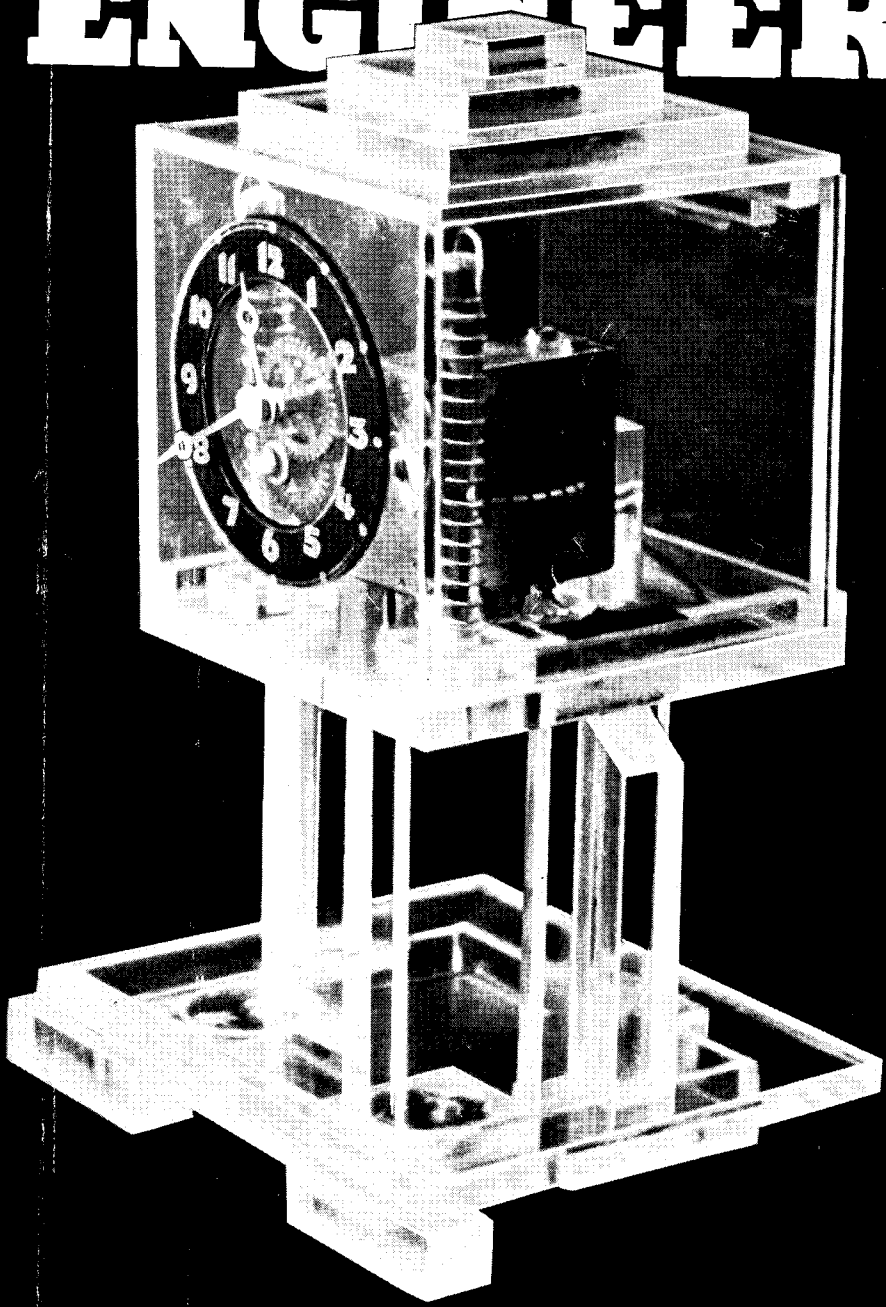
THE MODEL ENGINEER



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The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

21ST OCTOBER 1948

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SMOKE RINGS

Our Cover Picture

● THE CLOCK shown on our cover this week is the work of Mr. E. F. Scott, of Bristol. He writes that it was made up from odds and ends of Perspex collected over a period of two years, the motor being a "Sangamo" fitted with a 12 to 1 gear from an old alarm clock. The figures are engraved and filled with white enamel, and a black ring is painted inside the casing to provide a contrasting background. The clock was made for an electrical exhibition, coils in the base and the spirals in the top being for the purpose of creating an illusion that the motor is being driven by induction from one to the other. Actually, the motor is connected to the base by means of 48-s.w.g. enamelled wire *via* the pillars; this wire is not normally visible to the eye.

Mr. Scott's photograph was awarded the fourth prize in the recent "M.E." photographic competition.—P.D.

From the "Wide Open Spaces"

● JUST AFTER I had written my review of the Locomotive Section of the "M.E." Exhibition and my comments upon the locomotives on the International Stand, I received a copy of a booklet published by the New York Live Steamer Society, Inc. The contents are interesting and inviting, but there are two features which especially attracted my notice; the first is the sketch-map of the route to the society's track at Massapequa, Long Island, and the second is the whole page of illustrations of locomotives belonging to the Brotherhood of Live Steamers.

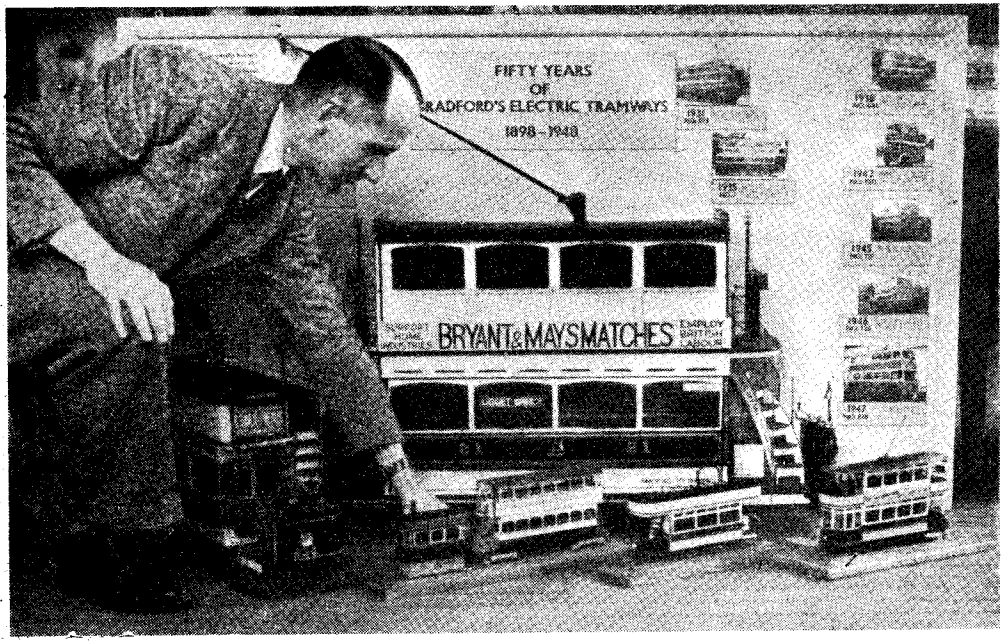
The sketch-map shows that the site of the track is 37 miles from Manhattan; the track itself is in the form of an enclosed loop providing a continuous circuit of 800 ft. in length. Apparently, two gauges are available, 3½ in. and 4½ in., the latter an odd one in our eyes.

The locomotives illustrated are most interesting; each is remarkable for the great wealth of detail accurately reproduced and, to all appearances, dead to scale. Nearly all are to ¾-in. scale and range from a massive N.Y.C. 4-8-4 by Claude Cox to what is, to me, the gem of the collection, Ed. Bergh's N.Y.C. 4-4-0 No. 999. This latter engine is a really beautiful job, judging by the photograph, and is seen hauling her owner; and he, by the way, is not the elderly person one might expect, but a young man with, apparently, a healthy appetite for old-timers! If this note of mine should happen to catch his eye, I invite him to send me a picture of "999"; I am sure she would delight many readers of the "M.E." And the same goes for any of the other engines seen in the booklet.—J.N.M.

Bradford Tramways Exhibition

● MODEL ENGINEERS living in or near Bradford will no doubt be interested to visit the Cartwright Memorial Hall Museum, where an exhibition entitled "Fifty Years of Bradford's Electric Tramways" is now on view.

This exhibition comprises a collection of models and photographs, showing stages in the development of public transport in this city. Among the exhibits is a model steam tram built by Mr. Eric Thornton to a scale of $\frac{3}{8}$ in. to the foot, representing a type operated as long ago as 1883. Other models by Mr. Thornton are of the open-top type, used from 1903, and the covered-top type, introduced in 1921. Also included among the exhibits are models by Mr. Frank Hartley, showing a type used in 1899, and a working model of the open-top type with lighting and power designed to operate at mains voltage. This exhibition, I understand, will be open until the end of the year.—P.D.



(Photo by courtesy of the Editor of "The Yorkshire Observer, and Telegraph and Argus")
The new exhibit being arranged

The S.M.M.L.A.

● BEHIND THOSE initials there lies a very commendable idea; for they stand for "The Stephenson Memorial Miniature Locomotive Association." Mr. T. Richwood, hon. secretary of the Sunderland Model Boating and Engineering Club, tells me that the club's hon. treasurer, Mr. J. Mutta, was responsible for the idea, but the title was suggested by Mr. Davis of the Tyneside Model Engineering Society.

The Association has been formed with the object of holding an annual competition, the purpose of which is to discover which is the most efficient miniature locomotive in the north-east of England. Membership of the Association is open to any recognised model engineering society in the North and East Ridings of Yorkshire and the Counties of Northumberland and Durham. The governing body consists of a Council of Delegates from the constituent societies, and, except for the Annual General Meeting, it meets as and when required.

The winner of the competition will be awarded a trophy, the form of which has yet to be decided. The performance of the competing locomotives is to be estimated by means of the following basic formula :—

$$\frac{\text{No. of complete trips} \times \text{Load in lb.}}{\text{Theoretical tractive effort} \times \text{fuel consumed in oz.}}$$

The tractive effort is to be assessed by means of the well-known formula $\frac{d^2 \times s \times p}{D}$, in which d is the cylinder diameter, s is the stroke, p is 85 per cent. of the boiler pressure and D is the diameter of the driving-wheels in inches.

I believe that this method of assessing the performance of a miniature locomotive is the same as that used by the South London Model Engineering Society, and it seems to give satisfactory results. In any event, I shall be most interested to watch the progress of the S.M.M.L.A. competition.—J.N.M.

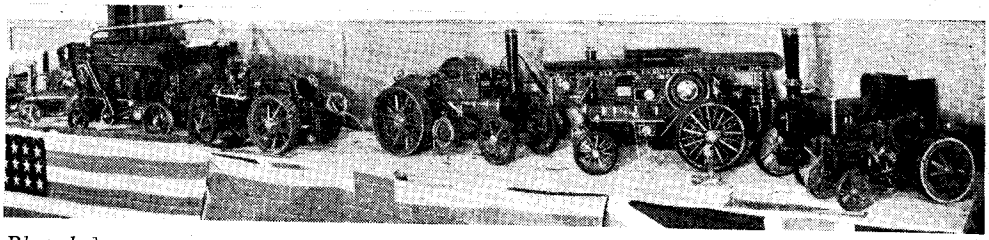


Photo by] *They like traction engines at Exeter!* *[Knights Studio, Exeter*

SOME OTHER EXHIBITIONS

by K. G. Mansell

TWO model engineering exhibitions, one in London and the other in Exeter, have confirmed an impression which I gained at our own "M.E." show, namely that the standard of workmanship this year displayed surpasses all previous efforts. The model engineers really have "gone to town" and produced a fine crop. May the good work continue!

I visited the North London Model Engineering Society's Exhibition at High Barnet on September 1st, opening day. This society is to be congratulated on a worthy show. I know the amount of planning and hard work that precedes this kind of display and can, therefore, appreciate just what their efforts had cost. The standard of models on show was gratifyingly high. The main attraction, as far as the visiting public was concerned, was the 4-mm. model railway layout which club members had transported lock, stock and locomotive shed from its customary place in the club premises.

The layout, which measures approximately 18 ft. by 12 ft., is a two-rail affair and locomotives are of the 12-volt variety. Some very interesting running was carried out, and the high performance of the locomotives spoke well of the permanent-way department. Incidentally, I was impressed by a neat W.D. 2-8-0 locomotive numbered 77127 which was standing in a siding. She looked as though she could move a tidy-sized train.

Considerable interest was displayed in the 3½-in. gauge lines. These were very short but a brisk business was being done in hauling junior enthusiasts. An attractive model of the "Royal Scot" gave a good account of herself. Built by Mr. Farrington, a member of the club, she answered every dictate of her young driver, the builder's son.

Examples of model ships, aircraft, racing cars and stationary engines showed that the scope of North London's Society is by no means limited.

I was particularly impressed by a truly splendid racing yacht built by H. Leslie.

I cannot here make mention of all the models, worthy as they indeed were, but I do congratulate the society on its fine efforts.

September 2nd saw me at Exeter, where the Exeter M.E.S. opened their exhibition. Here as before, the model railway proved the main attraction. This time, however, it was a gauge "O" line, surprisingly long considering the not too extensive hall. The trackwork was superb, brass rail with scale-spaced sleepering, the outside third rail an unavoidable necessity! What a treat well-laid track is! A Bassett-Lowke

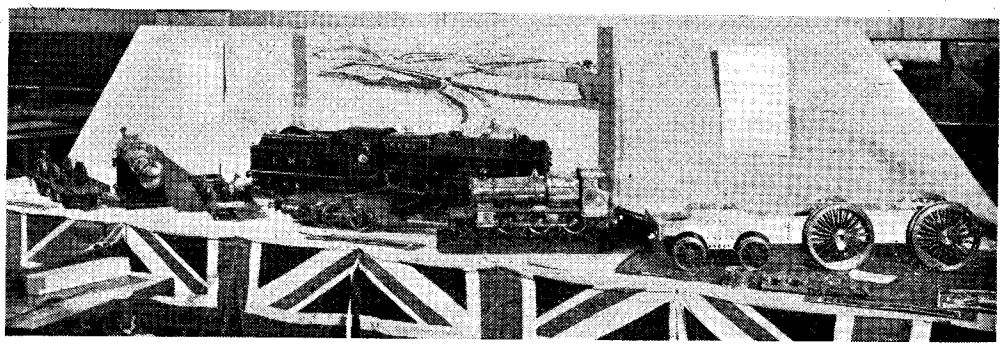


Photo by] *[Knights Studio, Exeter*

Some finished, some unfinished, but all very nice work. Another part of the Exeter show

Leading the "grand parade" at the opening of the Birmingham track, was Mr. Heaton's 4-6-4 Halton tank. Our illustration shows the engine about to break the streamer

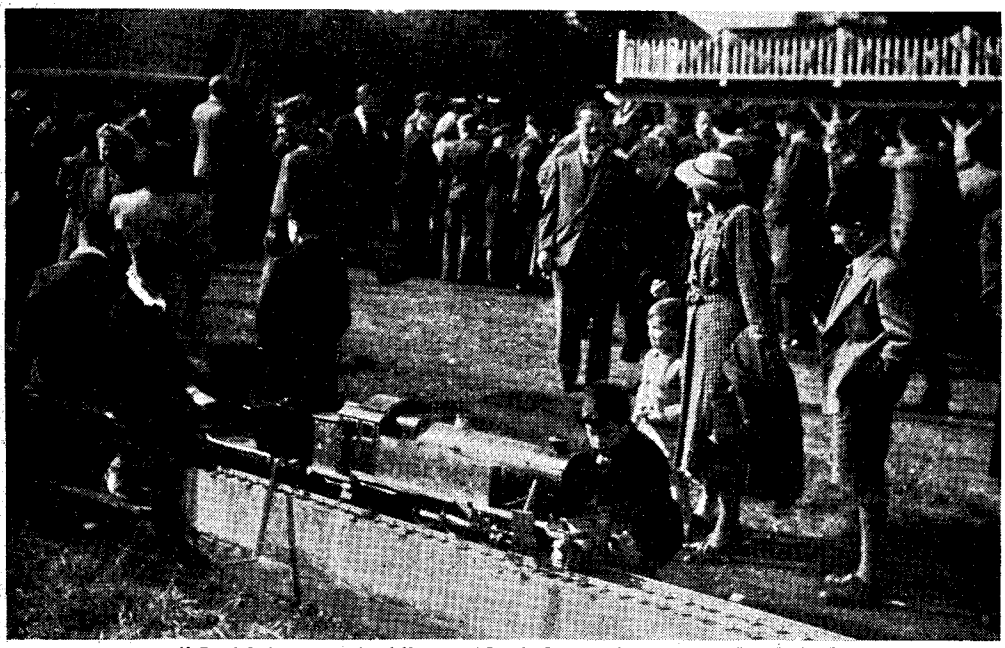
"Royal Scot" and "Flying Scotsman" did the honours here, and very well too. Each engine hauled an eleven-coach train with ease.

In the general show Mr. G. J. Websdale had on display his 50-lever interlocking frame; a beautiful piece of work this.

Mr. L. M. R. Hiscocks was showing an, as yet, uncompleted model of the R.M.S. *Queen Mary*, which promises to become a fine ship. Not a few were the pairs of eyes enviously turned in this direction!

A model hacksaw machine well known to "M.E." readers, I refer, of course, to that built by Mr. T. Spikes, was the centre of an admiring audience, as also was a superb compound condensing marine engine from the same stable.

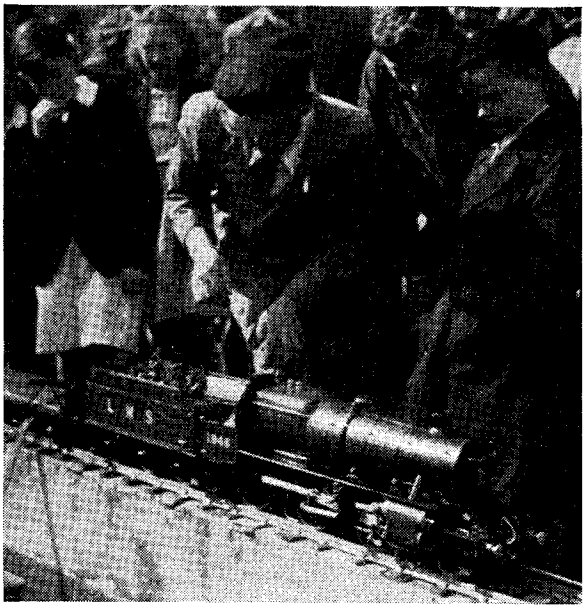
I was just a little disappointed in the standard of some of the model railway exhibits, the finish



"I wish it were mine!". President's locomotive was much admired

of some of these models was not good. Taken all round, however, this show came up to the highest standards.

On Saturday, September 11th, I went to Birmingham, not to an exhibition, as such, this time, but to the official opening by Mr. Campbell of the 3½-in. and 5-in. gauge outdoor lined owned by the Birmingham Society of Model Engineers Ltd. This line, which extends over 1,050 ft., is a splendid effort on the part of the members. It has been completed in, to my mind, a record time of two years, and is laid on concrete foundations throughout. The land was surveyed and foundations built in true engineering fashion. The result is a track that will need little attention in the future. The line is continuous and allows of plenty of "speeding." At present there is no super-elevation on the curves, but it is intended soon to alter this state of affairs.



Getting ready for the "off." No. 1946, built by the late Mr. Picknell. A really fine locomotive

After Mr. Campbell had made his opening speech, there was a "grand parade" of locomotives of both 5-in. and 3½-in. gauge, eleven in all, headed by the President's 4-6-4 locomotive *a la* G.W.R. and driven by Mr. Heaton himself. This engine had the honour of breaking a red, white and blue streamer held across the track by two youthful enthusiasts. To a chorus of high-pitched whistles and much joyful waving on the part of the passengers the trains set out on their inaugural run. In all, 59 passengers were hauled round the track on this trip; this figure had increased to some hundreds before the last train of the day had come home! Yours truly had a trip behind the late Mr. Picknell's 2-6-0 locomotive, No. 1946, which will be remembered by visitors to the 1946 "M.E." Exhibition. In places, riding was a little bumpy, but teething troubles of this kind will soon be outgrown.

Mr. Humphries, the Social Secretary, told me that it was hoped eventually to extend the scope of the outdoor activities by a track for cars and possibly a pond. I will not steal any thunder here, however, but there is no doubt that Birmingham can be justly proud of this most ambitious and progressive society.

For the Bookshelf

Caledonian Railway Centenary, 1847-1947. Published by the Stephenson Locomotive Society. Price 5s. 4d. by post from F. H.. Smith, 159, Davidson Road, Croydon, Surrey.

When enthusiastic amateurs set out to produce a lucid but authoritative review of the history of a particular railway, they set themselves a most exacting task if the project is not to meet with failure. This 76-page handbook, however, is unquestionably a success and a credit to its editor, Mr. L. R. Tomsett and his fellow-contributors, who include such authorities as Sir Eric A. O. Hutchison, Bart., J. F. McEwan and G. E. Langmuir. It is unmistakably a "labour of love," the greatest care having been very obviously bestowed upon the compilation of the text and the selection of the numerous illustrations. The result is a book which can scarcely fail to serve as a reference for future railway historians, and must surely be given a place on the bookshelves of any reader who is interested in the histories of our railways. We hope to see more ventures of this kind from the same source, in the not-too-distant future.

Private Owner. By L. R. Higgins. (London: G. T. Foules & Co. Ltd., 7, Milford Lane, Strand, W.C.2.) Price 8s. 6d.

Here is another book with a somewhat misleading title; indeed in this case the clue to the contents of the book is revealed in the picture on the jacket rather than the title. It consists of a personal narrative of adventures by a well-known racing motor-cyclist, who has taken part in many classic events at Donington, Isle of Man, and Ulster in the capacity of "private owner." The approach to the subject is mainly from the sporting angle, and it contains many thrilling anecdotes of racing personalities, but it also touches on technical aspects of motor-cycle racing, and is illustrated by numerous photographs of riders and incidents in many classic races.

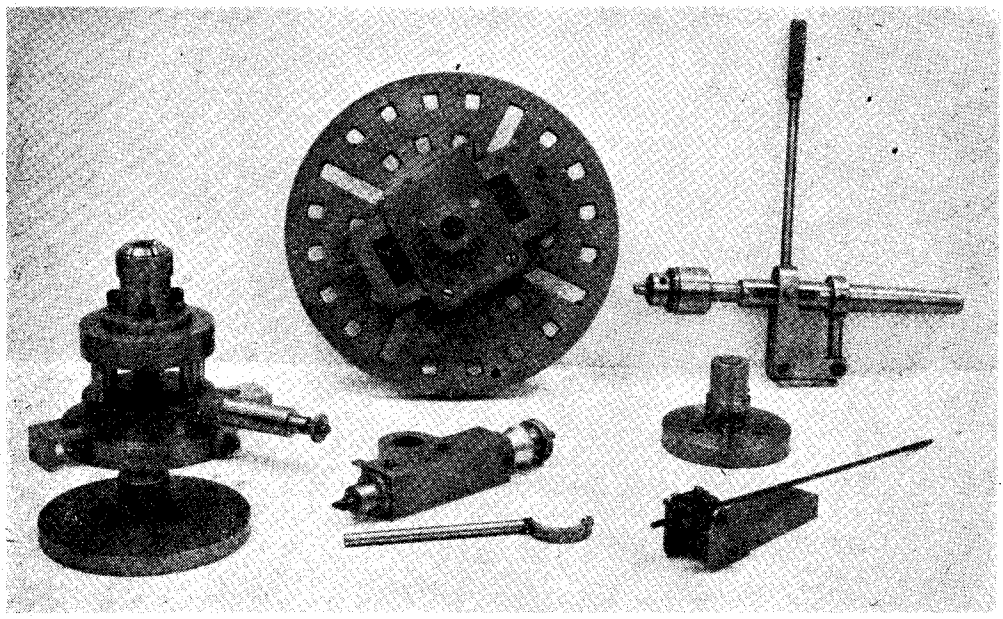
*Tools and Equipment at the "M.E." Exhibition

by "Ned"

A GROUP of lathe accessories by K. N. Harris (Nos. 230 to 232 inclusive) included a vertical plain dividing head with adaptors and split collets ; a faceplate with slide to carry an eccentric chuck, or boring and facing tools ; a lever-feed tailstock chuck attachment for fine drilling ; a supplementary slide with tool holder for screwcutting ; and a " wobbler " point centring such as are not always found in professionally-built machines of this type. Provision was made for using " Abrafile " or tension file blades in the machine.

Trade Section

Little need be said of the standard lines in workshop equipment, which have already been



A group of lathe accessories, by Mr. K. N. Harris

device. All these appliances were ingenious and of unquestionable utility.

The shaping machine by T. Spike (No. 241) was of interest as a true model of a larger machine, and it was a pity that its merits were somewhat obscured by a general lack of finish. Another machine which might have been better finished was the jigsaw by F. P. Blackford (No. 226), but in this case, it is fairly obvious that it had been built purely for utility, and as such served its purpose well. Here again, aluminium castings had been extensively used for structural components, including the work table. A commendable feature of the design was the pains taken to guide the blade in true straight-line motion, with adequate bearing surfaces in the guide members,

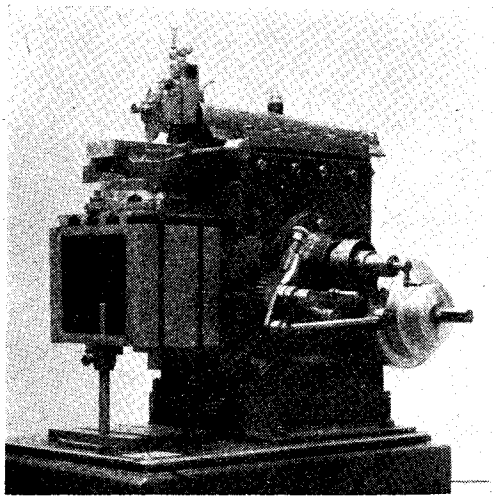
*Continued from page 398, "M.E.," October 14, 1948.

brought to the notice of readers in our advertising and editorial columns ; most of these were duly represented by tool dealers holding stands at the exhibition. Lathes are much more plentiful now than they were, though there is still considerable delay in deliveries of the more popular types, and an unfulfilled demand for lathes of a type comparable in equipment and value to the cheap screwcutting lathes obtainable before the war. Even allowing for the rise in prices and improvement in standards of accuracy, the discrepancy between the pre-war £5 lathe and its post-war counterpart at approximately £40 is too great, and forms a serious deterrent to many who wish to start a model engineering workshop.

Among lathes which have not been mentioned before in these columns, the new Faircut lathe seen on Messrs. Buck & Ryan's stand deserves special mention. The makers of this lathe, a well-

established Sheffield firm, have been producing sound machine tools for many years, and their pre-war products attained a good reputation among model engineers.

Among their modern productions, seen for the first time at this year's exhibition, were a $3\frac{1}{16}$-in.



A model shaping machine, by Mr. T. Spike

plain metal turning lathe, and another of similar specification, but with the addition of screw-cutting gear. These lathes admit a maximum length of $12\frac{1}{2}$ in. between the centres and will swing $8\frac{1}{2}$ in. diameter in the gap. The mandrel runs in adjustable taper cone bearings and is bored to clear $\frac{3}{8}$ in. diameter with No. 1 morse taper socket. The mandrel nose is screwed $\frac{3}{4}$ in. $\times$ 12 threads per in., and a ball-thrust race is fitted behind the shoulder of the mandrel. The drive is by three-speed vee-belt pulley.

Messrs. Buck & Ryan were also showing the Flexispeed lathe, which has already been brought to the notice of readers in our advertisement columns, but a new and larger model was shown for the first time this year, embodying generally similar features to the original model, but with $2\frac{3}{8}$ in height of centres, and admitting a maximum of $11\frac{1}{4}$ in. between centres.

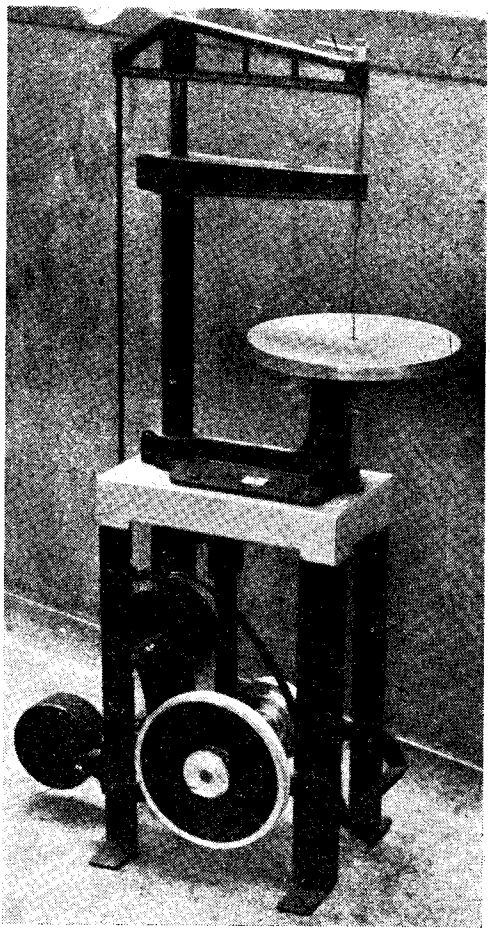
Another new lathe shown for the first time at this year's exhibition is the Grindturn 2-in. centre lathe. This lathe has a gap bed of rigid girder section, with a separate cast headstock and sliding saddle, also a tailstock with provision for setting over for taper turning. The slide-rest is of the semi-compound type, having a swivelling cross-slide. The spindle runs in phosphor-bronze bearings, and has a screwed nose to take standard chucks, also a taper socket for morse taper centres.

It will be noted that a distinguishing feature of this lathe is the fitting of a grinding wheel on the outer end of the mandrel; while we agree that this does to some extent widen the utility of the machine, we would candidly prefer to see it without this additional fitting.

Among other interesting machine tools seen at the exhibition may be mentioned the hand-shaper exhibited by Messrs. T. Garner & Son Ltd., which is made in two forms, for bench and pedestal mounting respectively, the latter being the more elaborate type of the two, and equipped with an ingenious self-acting gear for the cross-traversing screw.

Messrs. Buck & Ryan also showed an interesting hand bench shaper having $6\frac{1}{2}$-in. maximum length of stroke, work table 6 in. square, cross-traverse of 10 in., and $4\frac{3}{4}$ in. maximum height adjustment of tool.

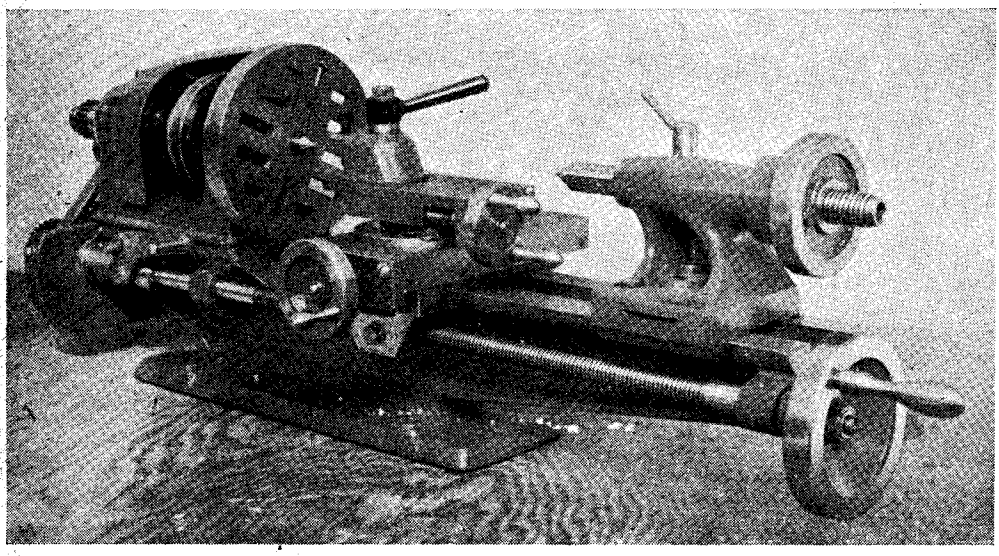
Among lathe attachments and accessories shown by Messrs. Buck & Ryan may be mentioned a new heavy-duty vertical slide of the non-swivelling type, but having provision for swinging



A jigsawing machine, by Mr. F. P. Blackford

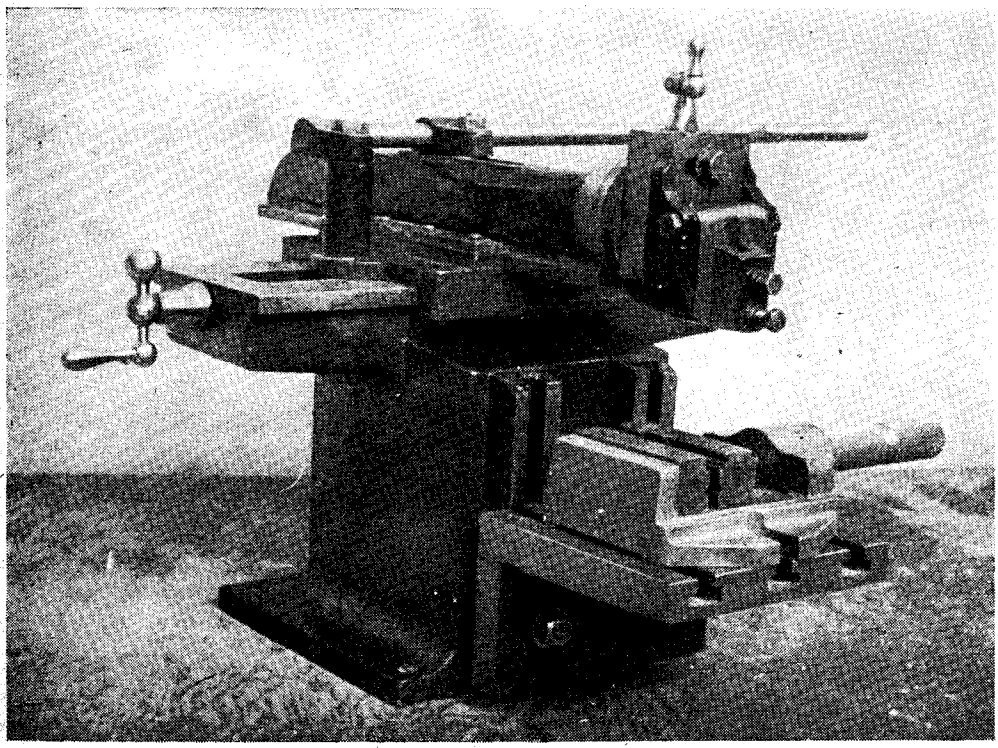
the baseplate through a fairly wide angle by a central bolt and a radial slot. The table of this slide is $4\frac{1}{2}$ in. $\times$ 5 in., with three tee slots, and is operated by a square thread screw with micrometer index.

The Griffin Metal Products Ltd. exhibited an

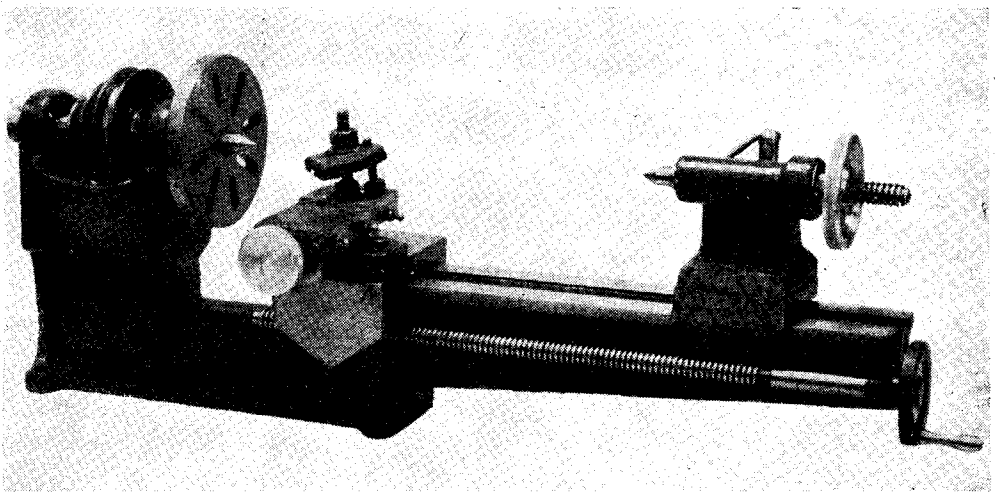


A new 3 in. Faircut lathe, by Buck & Ryan

entirely new line in light alloy bench vices which attracted a good deal of attention. The Griffin vice is of very clean external design and may be obtained either with a bright or enamelled finish. It is claimed that the combination of high-tensile light alloy and specialised design produces a strength equal to that of the more common steel or cast-iron vice.

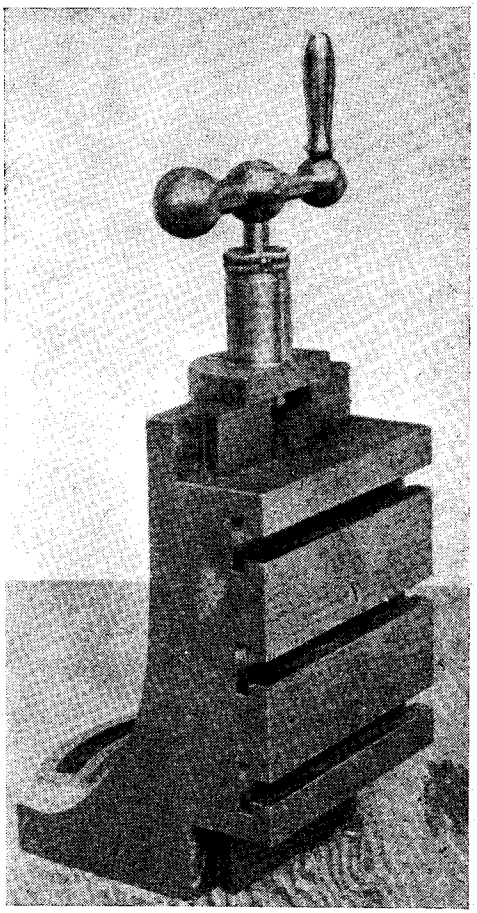


A new hand bench shaper, by Buck & Ryan



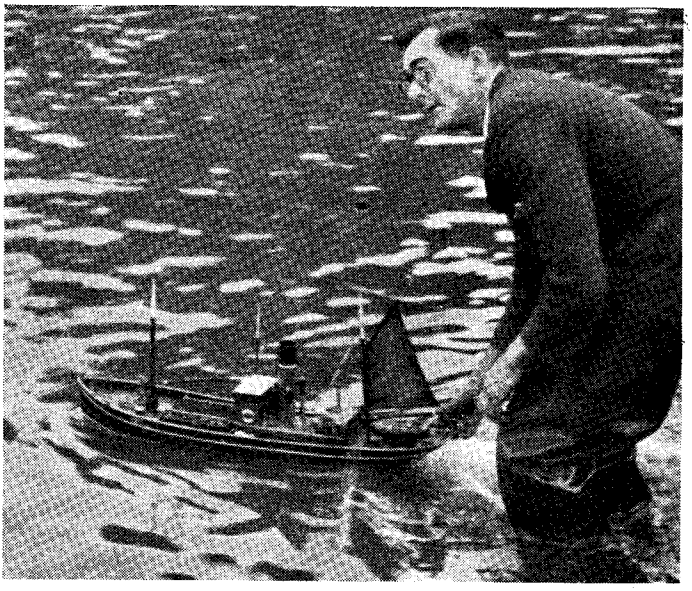
The 2⅝ in. Flexispeed lathe, by Buck & Ryan

A pedestal type hand shaper, by T. Garner & Son Ltd.



A heavy duty vertical slide, by Buck & Ryan

The Blackheath Regatta



Mr. Maclellan and his model drifter, winner of the Prototype Cup at the Grand Regatta

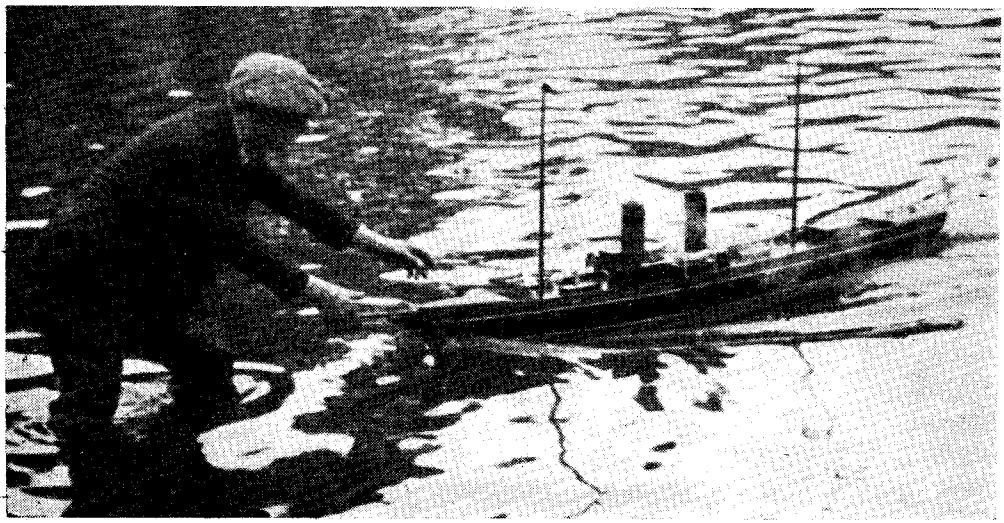
THE last M.P.B.A. Regatta of the season was held on Sunday, September 12th, at the Princess of Wales Pond, Blackheath, the Blackheath Model Power Boat Club being the hosts. A grand turnout of boats was seen in spite of poor weather, but quite a few thrills occurred during the various events to reward those competitors and spectators who braved the elements and came to this regatta.

The regatta was timed to commence at 11.30 a.m. and promptly to time the first event started, this was a Nomination Race for prototype and free-running craft and about 30 boats took their turn across the 50 yd. course. As an experiment, the timekeepers were at the starting end, and at the end of the course, the boats were flagged on completing. This arrangement worked well, no false starts occurred, and the event ran very smoothly. In spite of the measured course only a few boats came very close to their nominations, but the winner of the event, Mr. B. Whiting's *Joan* (Orpington) was only 0.1 sec. out. During the running, the fine prototype boats of the West London Club were much admired.

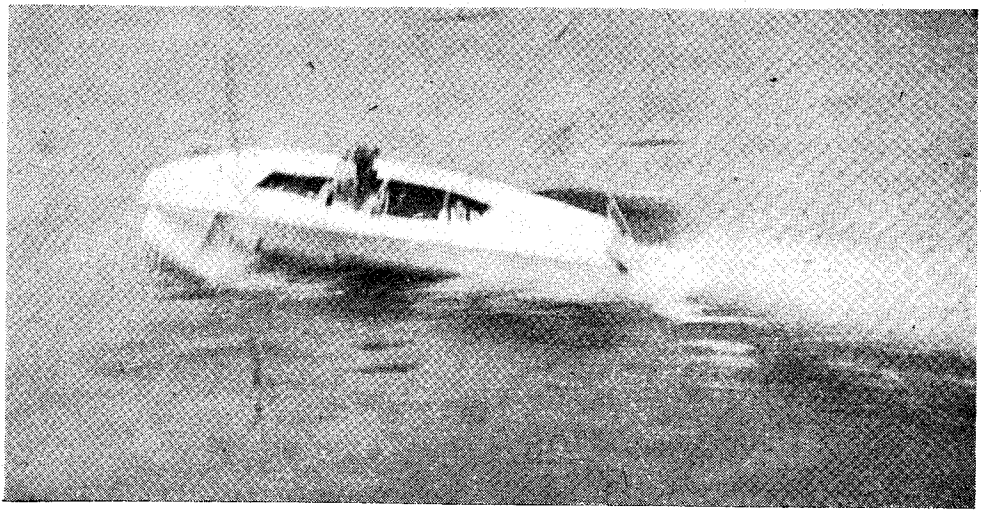
The result :

		error sec.
1st.	Mr. B. Whiting (Orpington) *Joan*	0.1
2nd.	Mr. J. Benson (Blackheath) *Comet*	0.4
3rd.	Mr. Robinson (W. London) *Elsie*	1

The next event was a 300 yd. race for B and C class hydroplanes, the boats running together



Veterans both ! Mr. W. Butler, of the West London club, with his steam yacht " Mary Dean "



Mr. Cluse's B class boat in the 300-yd. race

for convenience but sorted out in respective classes afterwards.

Mr. Stone (Malden) with a new C class boat had the misfortune to fracture the prop-shaft and thus could not compete, but hoped to repair the damage in time to get in a run at the end of the regatta, as very high speeds have been obtained recently.

Mr. Jutton's *Vesta II* had the misfortune to capsize on the first attempt, the boat taking off from the water and turning a back somersault, but on the second attempt completed at over 42 m.p.h., a magnificent performance.

Mr. J. Cruickshank's *Defiant III*, usually very reliable, gave trouble in getting away, the boat turning over upon being released.

Mr. A. Stone (S. London), with *Sizzle II* put up a good performance recording 35.3 m.p.h.; this was the best Class C speed in the event.

After several other boats had run, the results were sorted out and were announced thus:

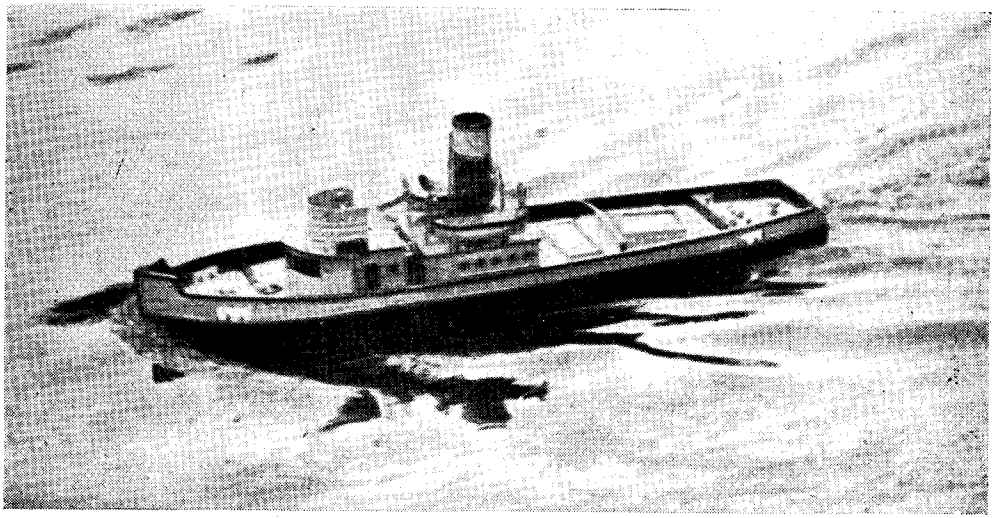
C Class Prize

	sec.	m.p.h.
Mr. A. Stone (S. London) *Sizzle II*	17.4	35.3

B Class

1st.—Mr. F. Jutton (Guildford) *Vesta II*	14.6	42.1
2nd.—Mr. Cluse (Orpington)	26	23.6

(*Continued on page* 432)



Dr. Machanik's model tug in the Steering Competition

IN THE WORKSHOP

by "Duplex"

* 22—A Cutter-grinding Attachment

THE tool carrier described and illustrated in the previous article was designed to be moved along the table by the hand in order to bring the cutter into contact with the grinding wheel.

Although this mode of operation gave good results, and many cutters were satisfactorily sharpened in this way, both on their end faces and on the sides of the cutting lips; nevertheless at times, it was found that the smooth travel of the carrier was hindered by the abrasive grains which fell on the surface of the table, particularly when the side faces of a cutter were being ground.

To overcome this difficulty, therefore, it was decided to fit a lever feed to the tool carrier; this addition has greatly improved the working of the device under all conditions, and any obstruction caused by grinding dust now passes almost unnoticed.

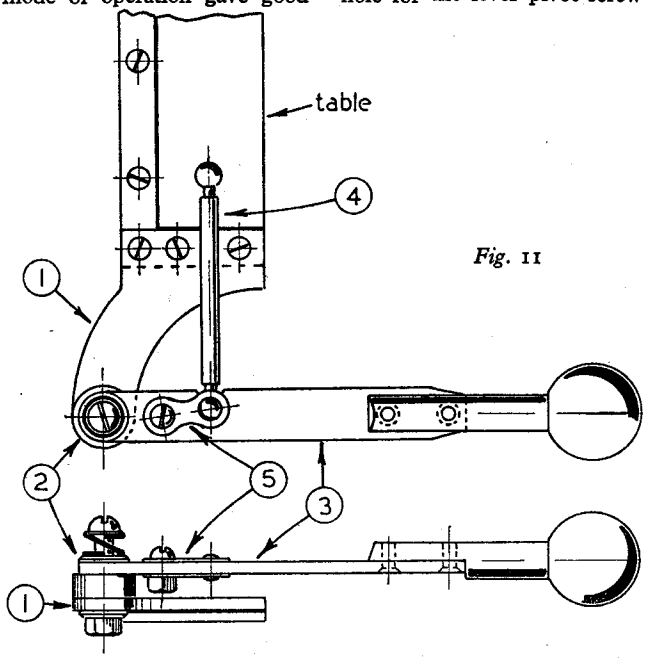


Fig. 11

The leverage obtained in this way is some 4 to 1, and the attachment is fitted in place of the stop fence secured to the left-hand end of the table.

The general appearance of the fitting is shown in Fig. 11, and the dimensioned working drawings bearing corresponding reference numbers are given in Fig. 12.

As will be seen, the bracket (1) carrying the lever (3) is attached to the table by three screws, and is tapped at its other end to receive the screw forming the pivot (2) for the lever. The ball-ended hand-lever is frictionally controlled and carries one end of a ball-ended shaft (4), which connects it to the tool carrier.

*Continued from page 377, "M.E.," October 7, 1948.

The Lever Bracket

This component, which is cut from a piece of mild-steel strip 2 in. wide and $\frac{1}{8}$ in. thick, is drilled $\frac{1}{8}$ in. to afford clearance holes for the three 5-B.A. screws used to secure it to the table. The hole for the lever pivot-screw is tapped 2-B.A., and the screw is secured by means of a lock-nut at its lower end.

The Lever

Although the lever can be made to any length desired, the dimensions given in the drawings should ensure satisfactory working. As will be seen, this part is built up from a length of $\frac{1}{2}$ in. $\times$ $\frac{1}{8}$ in. flat, mild-steel, attached to a piece of $\frac{3}{8}$ in. diameter round rod by means of two countersunk 5-B.A. screws inserted from the underside.

The flat end of the lever is drilled $\frac{3}{16}$ in. to give a working clearance for the 2-B.A. pivot screw. The round portion of the lever is threaded $\frac{3}{8}$ in. B.S.F. for the attachment of the ball knob. This knob can be turned from ebonite or plastic material, or, as an alternative, a standard commercial ball may be fitted; a visit to the car-breaker will, however, usually produce a good selection of these useful articles at a trifling cost.

The frictional control of the lever is provided for by a double-coil spring-washer compressed between two $\frac{3}{16}$ in. plain washers. A distance collar is fitted between the bracket and the lever to maintain the correct centre height in relation to the tool carrier, and thus allow the connecting-rod to lie horizontally. The dimensions of the parts forming the lever pivot assembly are shown in Fig. 12 (2).

The Connecting-shaft

For connecting the hand lever to the tool

carrier a ball-ended rod (4) is used which, as shown in the drawings, has a seating in the lever and is retained in place by means of the two cycle chain links (5). This form of ball joint has a good range of angular movement and has been found very satisfactory for use with operating controls fitted to many types of light mechanisms ; moreover, it has the advantage that it is constructed from standard parts with good wearing properties.

The phosphor-bronze balls used can be readily drilled through the centre by gripping them in the self-centring chuck in the lathe and then feeding in a $\frac{1}{8}$-in. centre drill from the tailstock ; this is followed by a 3/32-in. drill in the case of a $\frac{1}{4}$ in. diameter ball, and the countersink formed by the centre drill allows the end of the shaft to be riveted over to secure the ball in place. The links employed are obtained by disassembling a piece of ordinary cycle chain of $\frac{1}{8}$-in. pitch, and they are secured in place by a 5-B.A. bolt, as shown in the drawings.

It should be noted that these chain links do not take any strain, but merely prevent the ball falling out of its $\frac{1}{4}$-in. diameter seating hole drilled in the lever ; this hole, as represented in the drawings, has its free edges flared by filing, in order to allow the connecting-rod the necessary range of angular movement for it to follow the path of the tool carrier.

The connecting-rod itself is made from a length of $\frac{3}{16}$-in. diameter round silver-steel, and it is formed with a short neck at either end to provide working clearance in relation to the retaining links. To afford secure end-location for the ball, the diameter of these shouldered necks should be a little greater than that of the 3/32-in. diameter portion on which the ball fits.

Reference to Figs. 13 and 14 will show that the ball at the other end of the rod engages in a $\frac{1}{4}$ in. diameter hole drilled in the tool carrier, where it is retained in place by means of a latch. The depth of this hole is determined by a process of trial and error in order that the ball may seat correctly and without shake when the latch is closed. As shown in the drawings, the latch is cut from a piece of $\frac{1}{16}$-in. steel strip $\frac{3}{8}$ in. wide,

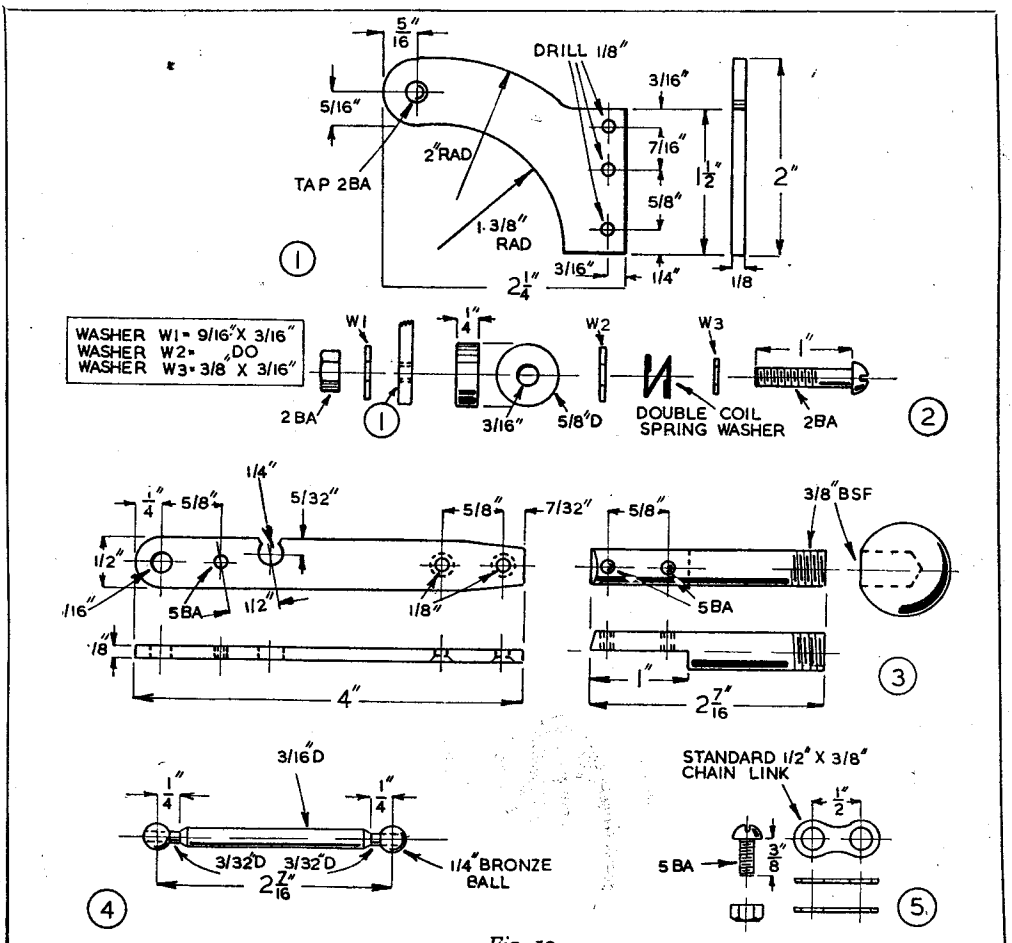


Fig. 12

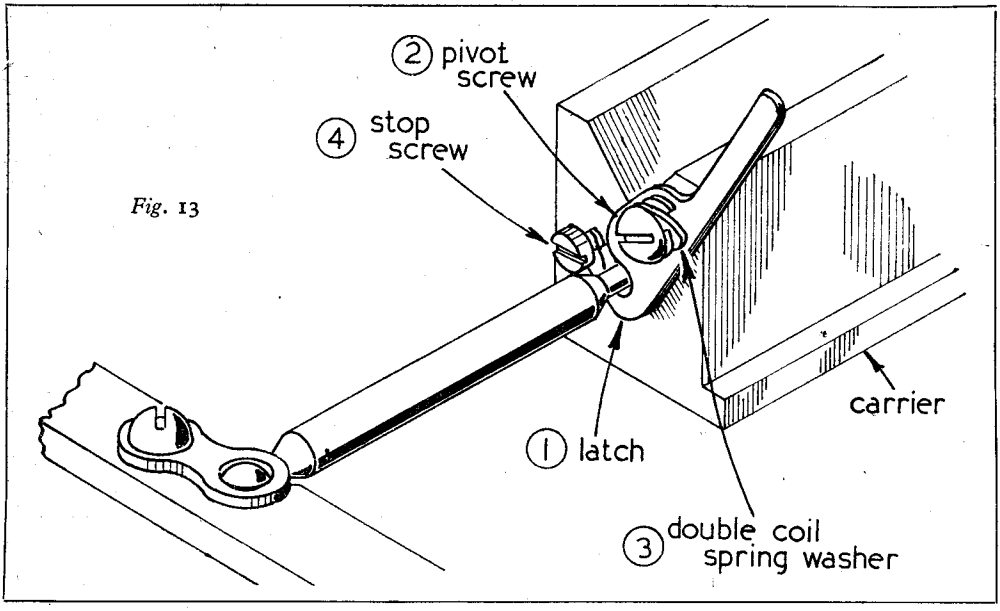


Fig. 13

and it is so proportioned that when subjected to vibration it will tend to close on the ball by the action of gravity.

Frictional loading is provided by means of a double-coil spring-washer fitted to the 5-B.A. screw which forms the pivot of the latch. A 5-B.A. stop screw is also fitted which limits the travel of the latch in its closed position and, at the same time, serves to prevent the latch being pulled off the face of the carrier during the withdrawal movement of the operating lever. The fitting of the latch in this way allows the connecting-rod to be disconnected from the tool carrier with a single movement of the finger, and when the tool carrier has been placed in position on the table it can be reconnected just as easily. This is a matter of some importance, as it will be realised that the carrier has to be removed frequently, both for resetting the cutter and also to allow the grinding dust to be cleaned from the sliding surfaces.

Operating the Jig

A description of the process of sharpening an end-mill on both its end and side faces will illustrate the method of using the grinding jig. In the first place, to ensure that the end of the cutter is ground square, the clamp-nut and the lock-screw of the base bracket are slackened and the table is rotated to bring the guide fence into a position at right-angles to the surface of the grinding wheel, as represented diagrammatically in Fig. 15. The bracket lock-screw is then firmly tightened.

Next, as shown in Fig. 16, the cutter is mounted in the carrier with one cutting lip supported in a horizontal position on the lip gauge, and both the cutter clamp and the lip gauge pivot-screw are then tightened to ensure that the cutter is firmly located.

It is important to secure the cutter firmly in place, as the friction of the grinding wheel tends to rotate it away from the lip gauge. The

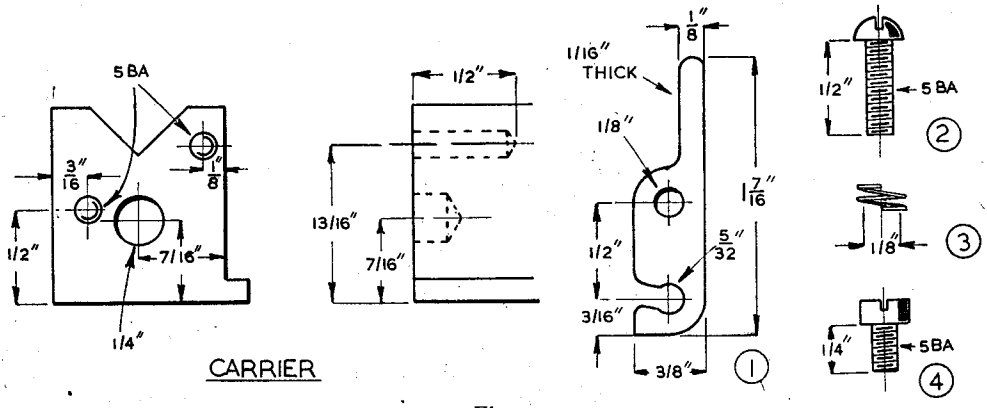


Fig. 14

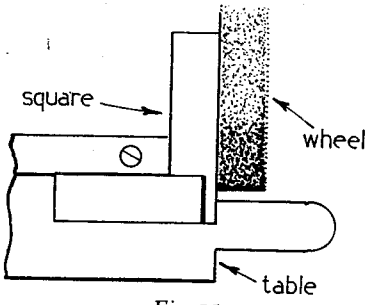


Fig. 15

stop-piece is now brought into contact with the base of the cutter and its clamp is tightened to ensure that, when the cutter is turned over to grind its other lip, it will be correctly end-located.

Slacken the bolt clamping the table bracket

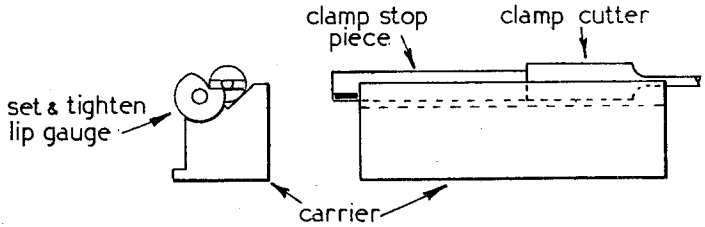


Fig. 16

to the pillar, and, with the aid of a protractor or a suitable template, set the upper surface of the table to 10 deg. in excess of a right-angle as measured from the side of the wheel and as shown in Fig. 17; the table clamping-bolt is then firmly locked.

Next place the tool carrier on the table in contact with the guide fence and, after slackening the base bracket clamp-bolt, rotate the pillar on its pivot to bring the centre-line of the cutter into line with the wheel, as shown in Fig. 18; then tighten the base bracket clamp-nut. The ball of the connecting-rod attached to the hand lever can now be engaged with the tool carrier, and the latch is then closed.

The carrier is next moved to the right to bring the cutter into light contact with the grinding wheel, and the adjustable screw-stop is set to check any movement beyond this point.

When the carrier is traversed by means of the feed lever actuated by the left hand, the right hand is used to press the carrier downwards to maintain it in contact with the table, and at the same time pressure is also exerted to keep the carrier against the guide fence attached to the rear of the table.

If the mating surfaces of the table and the carrier have been accurately scraped flat, it will be found that a little thin oil applied to the table will cause the parts to adhere firmly together; and, although it will then be difficult to separate them, the table will slide quite freely.

The grinding machine is now started, and the tool carrier is traversed by means of the feed lever until its movement is arrested by the table stop. The stop is reset as required in order to allow the lip of the cutter to be lightly ground; the latch is then opened and the carrier is removed from the machine so that the other lip can be set to the lip gauge. For this purpose, the tool clamp is slackened, but the setting of both the distance-piece and the lip gauge must remain unaltered.

The grinding operation is then continued in the same way on the second lip, and the whole process is, if necessary, repeated until both lips are found to have a satisfactory finish.

It will be clear that this will complete the sharpening of a counterbore or pin-drill, but in the case of an end-mill the side cutting edges will also require grinding from time to time.

For this purpose, the base bracket clamp-nut is slackened and the pillar is swung towards the operator in order to bring the cutter clear of the wheel. The cutter is then reset in the carrier until it projects sufficiently to allow the whole length of the side cutting edges to be brought

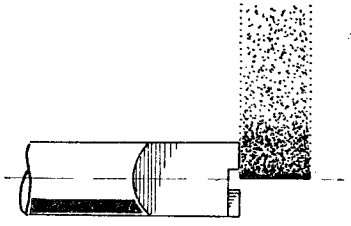


Fig. 18

into contact with the wheel as the carrier is traversed on the table; when this adjustment has been made, the distance-piece is set and clamped in the V-block in the new position.

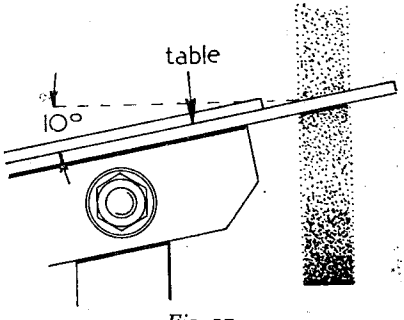


Fig. 17

As was previously pointed out, the centre-line of the cutter should be approximately at the centre height of the wheel when the table is in the horizontal position, so that when the table is

tilted to an angle of, say, 10 deg., the cutter will make contact with the wheel well above the wheel centre. The effect of this is that the resulting contact will be over a small area only, and not along the whole length of the cutter's side cutting edges; this will ensure more accurate grinding and there will be less risk of overheating the tool.

Reference to Fig. 19 will show the position of the cutter in relation to the wheel when sharpening the side cutting edges and, at the same time, forming a cutting clearance behind these edges. For this purpose, the lip gauge is used to set the tool correctly to the wheel as judged by the eye, and a light trial cut will show if this has been done so that a cutting edge is produced in accordance with the original form.

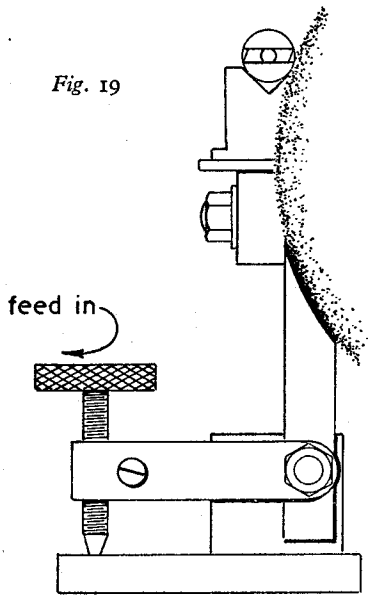
If the cutter is inserted in a hole in the drill gauge, the amount of clearance present can be readily estimated when the parts are viewed against the light.

When grinding the side faces, the travel of the tool carrier is adjusted by means of the table-stop as in the previous instance, and, as represented in the drawing, the cutter is brought into contact with the wheel by turning the adjusting-screw fitted to the lever which is attached to the pivot shaft of the pillar.

After this adjustment has been made, the base bracket is clamped and a light cut is taken along the whole length of the edge; this is repeated on the other lip, and the process is continued, with appropriate adjustments of the feed, until both lips are found to be correctly sharpened.

Although 10 deg. has been given as a grinding angle suitable for many forms of light cutters, this can be readily varied in special circumstances, as when a stronger cutting edge is required, or, if preferred, the clearance face can be ground in two steps of, say, 10 and 5 deg. in order to maintain the strength of the cutting edge, and at the same time to afford good clearance for chips.

Fig. 19



For all the operations described, it is essential that the grinding wheel should be in a good condition, and, if necessary, its surfaces should be trued and renovated by the application of a diamond tool or other form of wheel dresser.

The Blackheath Regatta

(*Continued from page* 427)

The lunch interval followed and after this, the regatta was resumed with a Steering Competition. Scoring was fair but not excellent, the targets looking quite small when 50 yd. off? Nevertheless, some well-known boats did quite well to score on all runs. Among these were Mr. Vanner's *All Alone* (Victoria), Mr. Bill Butler's *Mary Dean* (W. London), Mr. A. Rayman's *Yvonne* (Blackheath) and the winner, Mr. B. Whiting's *Joan* (Orpington). Mr. Whiting also won the Nomination event, so this brought off the double.

The final placings were:

1st. Mr. B. Whiting (Orpington)	*Joan*	8 pts.
2nd. Mr. E. Vanner (Victoria)	*All Alon*	7 pts.
3rd. Mr. W. Butler (W. London)	*Mary Dean*	6 pts.

The 500 yd. race for A class boats produced some disappointments; neither Mr. Miles's new boat fitted with a supercharged twin four-stroke engine, nor Mr. Pinder's famous hydroplane *Rednip* could get started properly. A sensation was caused when Mr. G. Lines flash-steamer *Blitz IV* pulled so hard on the line as to fracture a joint on the tripod head; in spite of a repair being made, another excellent run was spoilt by this joint collapsing. *Blitz IV* was doing over 40 m.p.h. when this happened. Luckily, although diving under, no serious damage was done to the boat. As some recompense, a special prize was awarded to Mr. G. Lines as his boat was all set for first place, when the tripod head gave way.

Mr. Walker's *Gilda* (Malden) was in good form in this race, and took first place with a speed of 36.8 m.p.h., the full result being:

		sec.	m.p.h.
1st. Mr. E. Walker (Malden)	*Gilda*	27.8	36.8
2nd. Mr. Parris (S. London)	*Wasp*	29.0	35.3

After the prize giving, at which Mrs. Vanner officiated, there was a little time left and the officials allowed the light line to be put on, and Mr. Stone (Malden) tried out *Lady Babs II*; this boat is fitted with an American 10 c.c. engine. It is believed that the speed witnessed is the highest so far recorded in any class in this country. The time for 500 yd. was 17.5 sec., about 58.3 m.p.h.

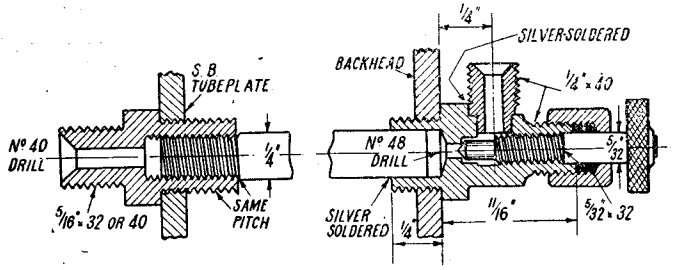
"Maid" and "Minx" Boilers

Final Brazing Operation

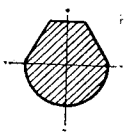
by "L.B.S.C."

WRITING instructions about how to do the final brazing job, on a hot day with bright sunshine, is enough to make anybody perspire, thoughts of it being quite sufficient; but I wouldn't mind betting that by the time you read these notes, the thoughts of a big blowlamp and a pan of glowing coke, will be as cheerful as a watchman's fire on a winter's night! Anyway, having got the boiler all assembled as mentioned last week, there is one more little item which might be done at this stage, to wit, the bushes for the dome and safety-valve. On smaller boilers, which have bushes in the backhead as well, I usually advocate silver-soldering the lot as a separate operation; but as there are only three for the "Maid" and two for the "Minx," on top of the barrel and wrapper, and the boiler is a tidy lump to reheat just for the purpose of silver-soldering them, we might as well kill all the birds with one shot. The dome hole on both boilers, is 2 in. diameter, and can be cut either by the usual method of drilling all holes around, breaking out the piece, and filing up, or else with a plumber's trepanning tool, which our friend who is reputed to forget to bring his tools, uses for cutting large holes in galvanised water tanks, and similar jobs. It is like a glorified centre-bit, but the cutting prong is adjustable, and can be set for any size hole within range. You could make one for yourself in a very little time, as shown in the sketch; a bit of brass rod would do for the spindle, and the cutter could be made from a bent piece of silver-steel, the cutting edge being ground up like a parting tool. To use, hold the gadget in a carpenter's hand brace; drill a hole in the middle of the circle to be cut, insert the pilot pin of the trepanner, and turn the brace. The cutter will soon carve out the circle of metal, a drop of ordinary cutting-oil aiding matters considerably. About sixty years or so ago, some long-forgotten person donated young Curly a couple of worn-out centre-bits, and that worthy found them very handy for cutting holes in the primitive boilers he made from coffee tins and similar "raw material."

The holes for the safety-valve bushes may be drilled in the ordinary way; but, beginners should note, I always drill them undersize, and finish with a taper reamer, because it is seldom that a big drill will make a true hole in sheet metal. The hole usually comes out polysided, especially when drilled in a convex surface such as the round-backed boiler shells. If no reamer is available, finish with a file; but a reamer suitable for this work is easily made by turning a piece of round silver-steel slightly taper, and filing three flats on it, as shown in the section. Harden and temper to a dark yellow. This kind of reamer trues up any hole without chattering.



"Thoroughfare" nipple and blower valve



Section of three-flat reamer

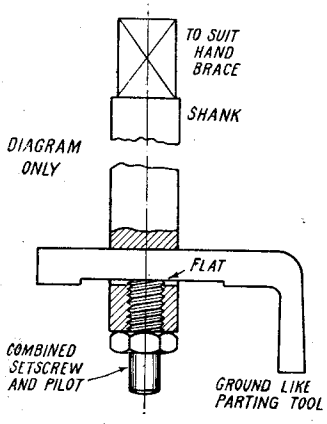
The bushes themselves are simple turning jobs, needing no detailing. Probably our advertisers will supply castings for the big bushes; the smaller ones can be turned from rod, or thick-walled copper tube. I use the latter wherever possible. They should be a tight fit in the holes in the boiler, so as to "stay put" whilst the backhead and foundation-ring are being brazed. If I haven't a piece of rod or tube big enough for a bush, I use a piece of copper plate. "Grosvenor's" dome bush was made from a piece of ¼-in. copper plate 1½ in. square. This was chucked truly in the four-jaw, faced off, and drilled to 1 in. diameter in two stages; the piece was then mounted by the hole, on the bottom step of the inside jaws of a small three-jaw which I keep especially for work requiring to be chucked from the inside, such as eccentric straps. The outside of the piece of plate was then carefully turned away, with due respect for the corners when starting the first cut, until it was a circle a bare 1½ in. diameter. This was further reduced for ⅛ in. length, to 1¼ in. diameter to fit the hole in the boiler, and there was a lovely copper bush, where once there was a piece of rough plate.

Sweat Without the Tears!

Have all your requirements handy, and plenty of oil in the blowlamp, for if it goes out during the process, the job may be spoilt. Put some wet flux all around the foundation-ring, backhead

seam, firehole ring, and bushes ; then lay the boiler on its back in the coke, pile up some more all around it, and put some asbestos cubes, or a piece of thick asbestos millboard, inside the firebox to protect the tubes. If your mate, with another blowlamp, is available, it will make the job easier. The actual process is pretty much the same as previously described, but much more heat is needed. Beginners remember that all the heat that a five-pint lamp can put out, isn't enough to burn the now assembled boiler, so don't be scared of " letting her go."

First heat the whole lot evenly, by moving the flame about steadily, and if the mate is available, the other blowlamp can operate on the other side of the boiler, thus catching it, as mentioned before, between two fires. Then concentrate on one corner of the foundation-ring, get it to bright red, and apply the brazing strip. If it doesn't want to start, a little coarse-grade silver-solder can be used to help it. Apply this first, and then



Home-made trepanning tool

introduce the brazing strip into the melted silver-solder. Don't forget to dip the strip, or the silver-solder, into some dry flux *every time* before applying to the copper ; this is a wonderful help in easy running. If you have no mate, and are relying on your own unaided efforts with a single blowlamp, it might be as well to use the coarse-grade silver-solder alone, for backhead and foundation-ring. The job will be amply strong, and just as everlasting ; the only drawback is the expense on a boiler this size.

Proceed as before ; work your way completely around the ring by " half-inch stages " in a manner of speaking, taking the same strict caution as before, to see that each dose of metal applied, melts and runs into the grooves at each side of the copper bar forming the sections of the foundation-ring, and forms a fillet between them and the adjacent plates. If you do that, it will be impossible for the foundation-ring ever to start sprouting Welsh vegetables. Patience and perseverance are the watchwords for this job. Give an extra blow-up when you arrive back at the starting point after completing the course, to make sure the joint is absolutely continuous.

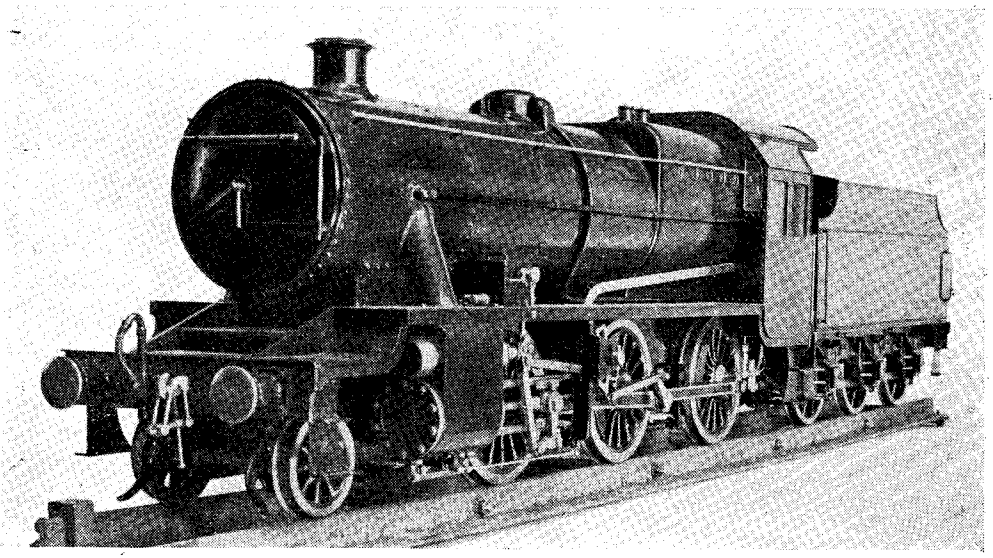
Next, with the big tongs, up-end the boiler in the pan ; and starting at one bottom corner of the backhead joint, work your way right around as before, making certain that each little bit is O.K. before you go any further. With two blowlamps going, the boiler should keep hot enough for the job, without any more coke packing ; but if only one lamp is available, call the coke to your assistance thus. Put the bit of metal, or tray, with the hole in it (the bit used for the smokebox tubeplate operation) right alongside the brazing pan, propped up on anything available. When the foundation-ring is done, lift the boiler with the tongs, and poke the barrel down through the hole, letting the throatplate rest on the tray ; then with the domestic coal shovel, transfer some of the hot coke from the brazing pan to the tray, piling it right up to the level of the backhead. Don't waste any time, but get busy with the blowlamp again right away before either coke or boiler has time to cool. As you blow on the bottom corner, the coke will glow again and supply the extra heat needed to maintain the metal in the flames, at the melting temperature of the brazing material. Work right around steadily as before.

The flange of the firehole can be treated with first-grade silver-solder (" Easyflo " will do this fine) and if the flame of the lamp is directed straight on the flange, it will become sufficiently hot to melt this material, which only needs dull red. The boiler can then be stood right way up in the coke, in the brazing pan, and the bushes fixed by direct application of the blowlamp flame plus a little " Easyflo " or similar first-grade silver-solder. That will finish the brazing job ; and if carefully carried out, although you may have had plenty of sweat, the boiler certainly won't have any tears ! Let the job cool to black, then carefully lower it into the pickle ; mind the splashes, for there will be a terrible commotion when the pickle enters the boiler and is promptly blown out again by the hot " innards." However, it will settle down in a few seconds. Leave it for 20 to 30 minutes, then take it out, well wash in running water, inside and out, and clean up as before.

No coke packing need be used with oxy-coal or oxy-acetylene blowpipes. Use the biggest oxy-coal tip available, plus either brazing strip or Sifbronze ; use the 1,000-litre tip in the oxy-acet. and " tone down " the flame a little, so that it doesn't hiss so much as when fusion-welding. Use Sifbronze, and the special flux sold with it, with the latter blowpipe ; not brazing strip, for reasons previously mentioned. Sifbronzing differs from ordinary brazing, inasmuch as it really makes a surface weld. I recently Sifbronzed a patch on our domestic kettle. It was one of the " quick-boiling " variety, purchased umpteen years ago from the local gas company, and had a casing around the body, to keep the heat in, like the casing of a water-tube boiler. When starting from cold, moisture condensed under this casing, just like it does on a locomotive boiler, and then dried off. When the tinning finally burned off, our insidious old enemy, Mr. Rust, got busy, but his action was hidden by the casing, until finally he nibbled clean through the body of the kettle, and one fine morning the water burst through and put the gas out. I said I'd solder the

leak to make the kettle " hang it out " until my fair lady could get a new one ; but, oh, dear ! when I pulled off the casing and touched the leaking place, a hole appeared as big as a shilling. Not only that, but the metal was so pitted that a file would not clean around the hole, sufficient for any solder to " take."

Well, as I said before, there are more ways of going from Charing Cross to Dover than by the direct line (I believe the journey actually can be made by 57 different routes) so I thought that what the soldering bit couldn't do, the blowpipe probably could. I didn't clean the metal any more, but just cut a bit of tin a bit bigger than the hole, and stuck it on with some wet Sifbronze flux ; put a small tip in my Alda blowpipe (150 litre) and got busy, using a $\frac{1}{16}$-in. welding rod. The way that Sifbronze amalgamated with both the tin patch and the dirty and pitted metal of the kettle body, was just nobody's business ; and when the kettle was tested with a drop of water, leakage was *non est*. The kettle was then boiled out to remove all traces of flux, etc., and put back into service *pro tem*. At the time of writing, it is still in frequent use, my Glasgow lass being loth to discard an old servant, although we have since acquired two posh aluminium kettles. Looks as though I'll have to stick a pin through one of the rusty patches whilst she is out shopping !



Mr. L. H. Wilmot's 5-in. gauge " Dyakmarina "

A Test for " Pinholes "

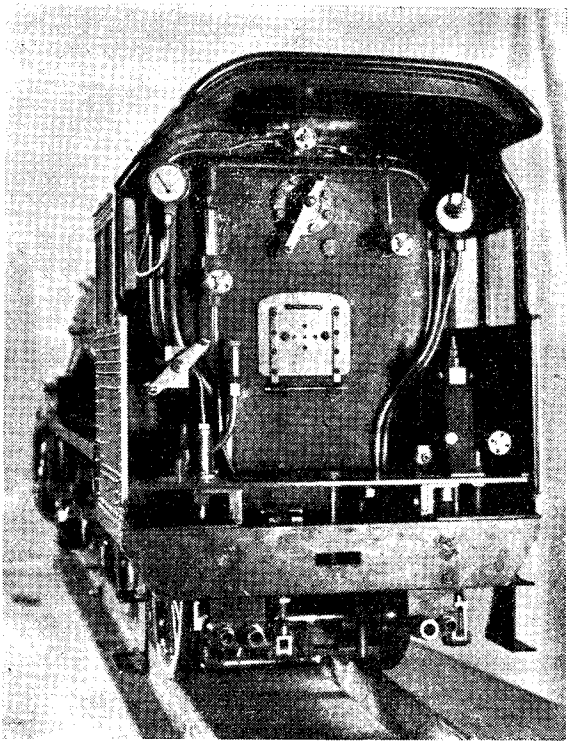
At this stage of the proceedings it would be advisable to give the boiler a rough test to ascertain if there are any " pinholes " in the brazing. Beginners take heed that these are caused by borax in the flux bubbling ; you don't get them if the bubbles are all broken up by liberal use of the scratching wire. Plug all the bush holes and tapped holes except one, by wood plugs ; tapered pieces of wood will screw into the tapped holes tightly enough to resist the small pressure needed. The dome hole can be plugged with a cork bung, with string or thin wire tied around the boiler barrel to hold it in. Make an adaptor for the " odd man out," and couple a tyre-pump to it ; pump about 15 to 20 lb. of air pressure in, and immerse the whole doings in the family bath-tub, like testing a cycle or motor tube. If any bubbles appear, note the spots ; drill a 55 hole, tap it 10-B.A., and screw in a stub of 16-gauge copper wire with a smear of plumber's jointing on the threads. Cut off and file flush ; this will be an absolutely permanent repair.

Staying

Each boiler has four longitudinal stays, three solid and one hollow. If a Belpaire firebox has been adopted, this will need seven cross-stays in the wrapper sheet as well. All the solid stays, both longitudinal and cross, are fitted in the same way by blind nipples, as shown in the illustrations. The nipples are made from $\frac{7}{16}$-in. hexagon brass rod. Chuck in three-jaw, face, centre, drill down with 7/32-in. drill for $\frac{7}{16}$ in. depth, and tap $\frac{1}{4}$ in. by 32 or 40. Turn down $\frac{3}{8}$ in. of the outside to $\frac{3}{8}$ in. diameter, and screw $\frac{3}{8}$ in. by 32 or 40, same pitch as the tapped hole. Part off a full $\frac{9}{16}$ in. from the end ; reverse in chuck, and chamfer the corners of the hexagon.

Get the length of stay rods from the actual boiler, in case of any slight variation from given dimensions ; they should reach from the inner side of the backhead to the inner side of smokebox tubeplate. Warning : don't use brass rod for these stays, as brass will waste away. Either copper or phosphor-bronze is the correct material. Cut to length, and then put $\frac{7}{16}$ in. of thread on each end, to match the tapped holes in the blind nipples. To insert, put a smear of

plumber's jointing on the external threads of the nipples; screw a stay rod in about two or three turns, and insert into the hole at one end. It will require a bit of judicious wangling, to get the loose end through the other hole, if done in the usual way. What I usually do, is to get a bit of tube about half as long again as the boiler, and of a diameter that will pass through the tapped holes in the backhead and smokebox tubeplate. This is poked right through the boiler, and the end of the stay rod inserted in the tube. When the tube is then carefully pulled out, it guides the end of the stay rod to the exit hole. The nipple for that end is then started on the projecting bit of thread, and both nipples screwed right home, locking the whole lot solid, as the external threads take a bearing in the tapped holes in the backhead and smokebox tubeplate. The cross stays for the Belpaire firebox are put in the same way; a little preparation is needed first, as the stay rods have to go through the crown-stay girders.



A neat arrangement of footplate fittings

Mark off on the sides of the Belpaire wrapper, the location of the stay rods as shown in the illustrations, and drill a $\frac{5}{16}$-in. hole at each point. Now put the $\frac{5}{16}$-in. drill in the three-jaw, and the centre-point in the lathe tailstock. Enter the drill in one of the holes in the wrapper, hold the boiler level, and enter the tailstock point in the corresponding hole the other side. Lock the tailstock, start lathe, turn handwheel, and the $\frac{5}{16}$-in. drill will make a hole in the correct place, through one of the side crown-stays, and the middle one as well. Turn the boiler the other way around to drill the other girder, simply repeating process. The end holes in the central girder aren't holes at all (says Pat) but half-round nicks, just deep enough to clear the stay-rod; these can be filed by inserting a $\frac{1}{4}$-in. round file through one of the drilled holes in the wrapper, but take care not to file the outer holes as well! For jobs like these, I Sifbronzed a broken bit of file about 2 in. long, on to a bit of $\frac{1}{4}$-in. round mild-steel, so there is no earthly chance of damaging or enlarging the hole in the wrapper if I file from now until doomsday. The holes in the wrapper are then opened out and tapped to suit the nipples, and the stay rods inserted.

The hollow stay is a piece of $\frac{1}{4}$-in. by 16-gauge copper tube, same length as the solid stays; but the backhead end carries the blower valve, and the smokebox end carries a thoroughfare nipple instead of a blind one. The inner end of this is made the same as a blind nipple; but part off at $\frac{7}{8}$ in. from the end. Reverse in chuck; turn down $\frac{5}{16}$ in. of the end to $\frac{5}{16}$ in. diameter and, screw $\frac{5}{16}$ in. by 32 or 40. Centre deeply and drill with No. 40 drill right into the tapped hole at the other end. The blower valve is made from $\frac{1}{2}$-in. round brass rod, and is practically the same as the injector steam valves described in full detail for "Lassie," "Molly," and other engines, so there is hardly any need to repeat the full ritual over again. The reproduced drawing gives the dimensions; the difference between this one, and those mentioned above, is that the part which screws into the boiler is turned to $\frac{3}{8}$ in. diameter, screwed to fit the tapped hole in the backhead, and counterbored $\frac{1}{4}$ in. bare (letter "D" drill) to take the hollow stay, which is silver-soldered in at the same heating, when silver-soldering the union nipple into the body of the valve.

To insert the hollow stay easily, poke a long piece of 3/32-in. wire (which should be straight) clean through the boiler, via the extreme right-hand holes—don't forget, says Pat, that the right-hand side of the boiler is on your left, begorra, when looking at the smokebox tubeplate. Then put the screwed end of the hollow stay over it, and pull out the wire, which will guide the hollow stay to its destination; screw the blower valve right home, and then put the thoroughfare nipple on the other end, screwing that home, too. Don't forget a taste of the plumbers' jointing on the threads, and go easy with the spanner, because threads in soft copper don't need much encouragement to strip. Next item, firebox stays; nobby job for a few spare evenings!

(*Continued on next page*)

AN INDEXING DIAL

by A. G. Stenning

THE drawing reproduced here shows general details of an indexing dial with frictional drive, suitable for most lathes or feeds of other machines.

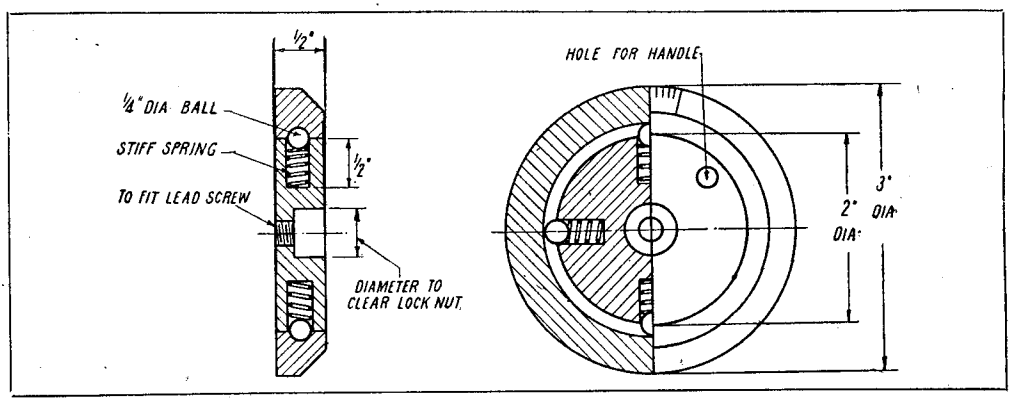
I do not recall seeing a similar idea in the columns of THE MODEL ENGINEER before, and for that matter cannot truthfully say it is original, as the idea came to me when dismantling a synchro-mesh gear recently—the principle of the spring-loaded balls being used on the particular type I was working on.

It is fitted to a Myford ML.4. in my case, and has the advantage of being exceedingly compact and requiring no extension to the leadscrew, and also does not project any further than the original ball handle.

The material used was dural, for ease of turning, steel balls and short stiff springs of about 20 gauge wire, one handle which is omitted for the sake of clarity—was saved from the original ball handle.

The dial is best assembled dry, the procedure being simplified by fitting a Jubilee water clip round the balls, placing the outer portion of the dial in position and giving it a smart tap with a rawhide mallet, when the clip will be pushed off and the balls take up their location in the annular groove in the outer ring.

The dial can be easily taken apart if the outer part is rested on a suitable ring and the centre given a good sharp tap with the mallet—but look out for the balls and springs this time!



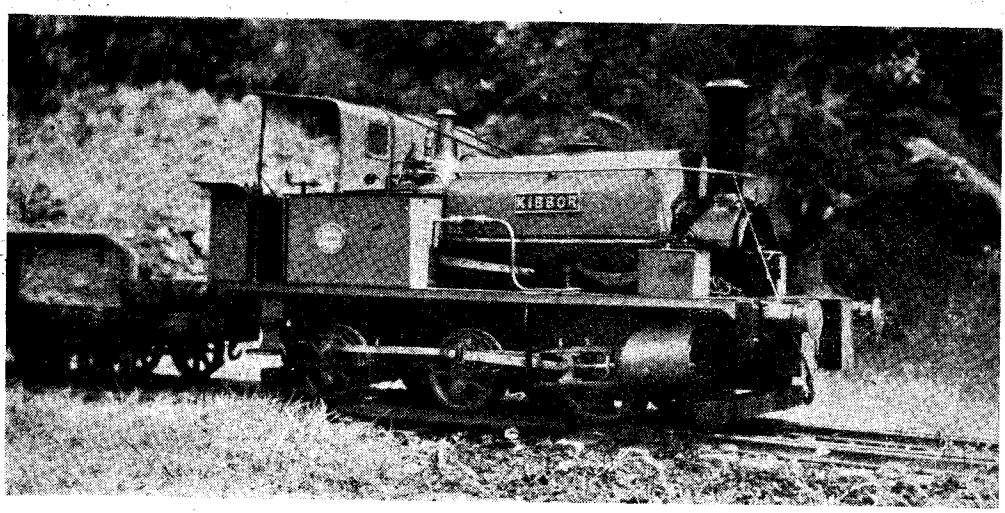
"L.B.S.C."

(*Continued from previous page*)

"Baernegum" Does It Again!

The lads of the West Midland village with the above local phonetic pronunciation, certainly know how to build locomotives. The latest example, illustrated here, is the handiwork of Mr. L. H. Wilmot, one of the original members of the Birmingham S.M.E. and a fine craftsman. The locomotive is a 5-in. gauge combination of "Princess Marina" and "Dyak," with a dash of L.M.S. for "makeweight," and has turned out very well, both in appearance and performance. She has fully-compensated steam-operated brake-gear, working leaf-springs on the tender, and various other refinements. The boiler steams like a witch; and as for power, she hauls eleven adults (all the cars will take) notched up nearly to middle with only a crack of throttle. I can see some records being put up at Campbell Green!

Friend Wilmot asks me to pass on a warning. He used a well-known patent filling when bending his tubes, and although he flushed them through with boiling water as per instructions, some of the filling remained in. Consequently, the first few runs were a packet of trouble through gummed-up pistons, spindles, drain cocks, etc., and when the engine was cold, everything set solid, necessitating taking the whole lot down to free them. The trouble has now disappeared. Personally, the only filling I now use for bending tubes (which is very seldom, as I prefer to bend them empty, with my fingers) is lead wire, as mentioned a little while ago. Congratulations to our worthy friend on his excellent job, especially the neat riveting.



The 0-6-0 locomotive "Kibbor," a Hunslet Engine Co. type

"Kibbor" and Other Things

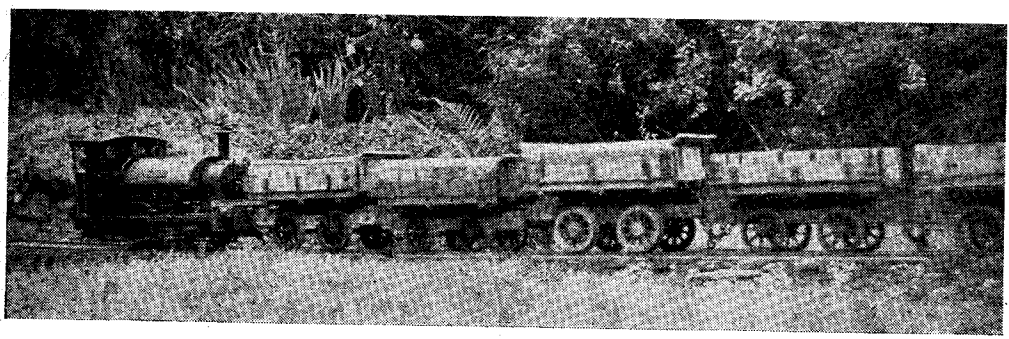
by L. I. Heath

THE five photographs reproduced herewith show various models which I have built during the last forty years. The following notes deal with each photograph, in turn, and may be of interest to other readers :—

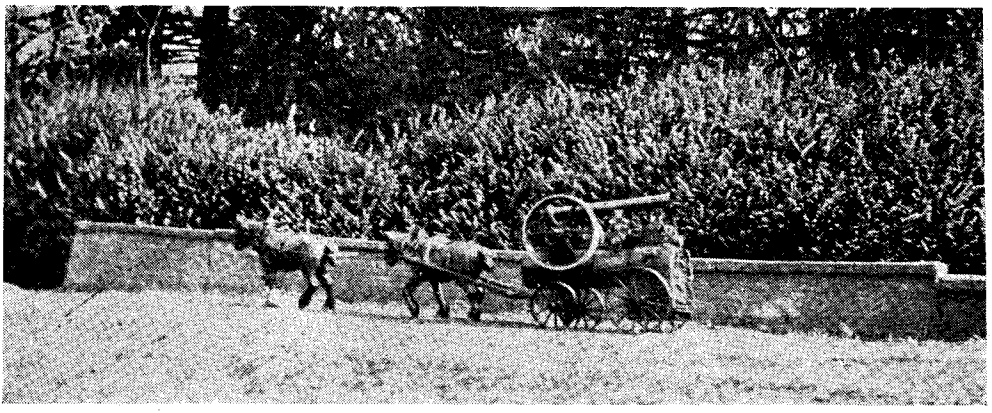
About 1909, I started building my first locomotive, a model of an 0-4-0 "Hunslet," which had a Smithies-type boiler with cylinders $\frac{5}{8}$ in. × 1 in. Soon after it was finished, about 1912, I dropped it down a flight of stairs, but as it had not been a success, this may have been an advantage.

I immediately salvaged a few fittings and started another 0-4-0 Manning Wardle using the same name, "Kibbor." This model, which was completed some seven years later, had new cylinders $\frac{3}{4}$ in. × 1$\frac{1}{4}$ in. and a coal-fired locomotive-type boiler with five $\frac{5}{8}$-in. tubes. This was a much better looking locomotive than the previous one, but not a great success as far as power was concerned. About 1930, I made a new boiler, this time with nine $\frac{5}{8}$-in. tubes and two $\frac{5}{8}$-in. flues. The boiler was brazed for me, and turned out to be a great improvement.

During 1944, I obtained an old catalogue of the Hunslet Engine Company's locomotives, and found an illustration of an 0-6-0 with a boiler which, when built to my scale of one-tenth full-size, corresponded with mine. So I again scrapped "Kibbor," building an 0-6-0 with 1-in. × 1$\frac{1}{2}$-in. cylinders, and using the boiler and certain parts from the old 0-4-0. The engine is now powerful and works very much better than ever before. In this case, I



The 0-4-0 locomotive "Kenya," Bagnall type, with Manchester Ship Canal type tip wagons



Model of a 5 n.h.p. Marshall portable engine on the road

had cylinder and wheels cast locally from my own patterns. ' The wheel castings were very hard to machine at first, but, by leaving them overnight in the fire, I was able to do this.

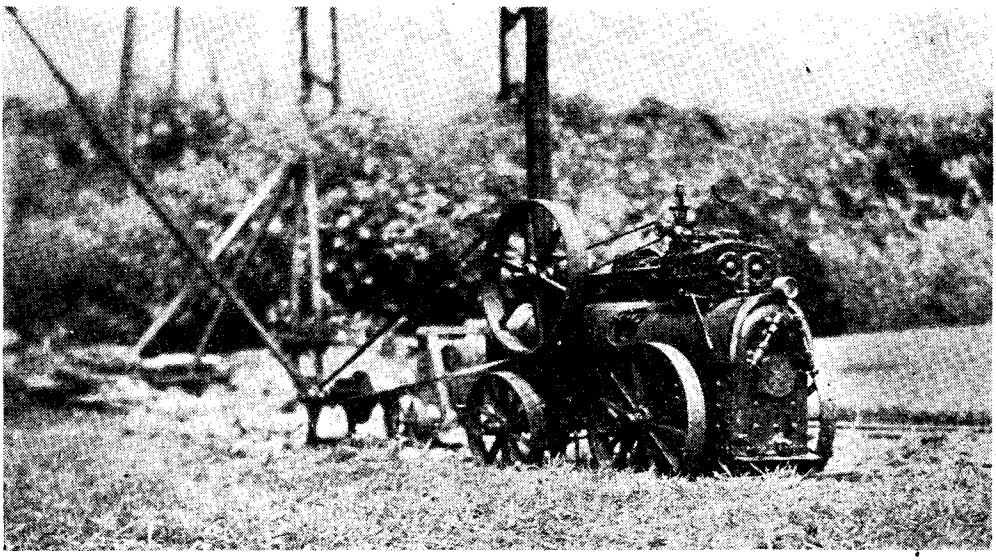
The locomotive " Kenya," which I built about ten years ago is a copy of a small Bagnall ; it is fitted with Bagnall and Prices valve-gear and was illustrated in THE MODEL ENGINEER in 1938.

The small portable was built during the war, mainly from scrap ; it has a coal-fired locomotive-type boiler, and working cross-arm governors. The horses are about 6¼ in. high at the shoulder and were made for me by a wood carver. The harness, which is correct in every detail, each buckle being workable, I made of leather.

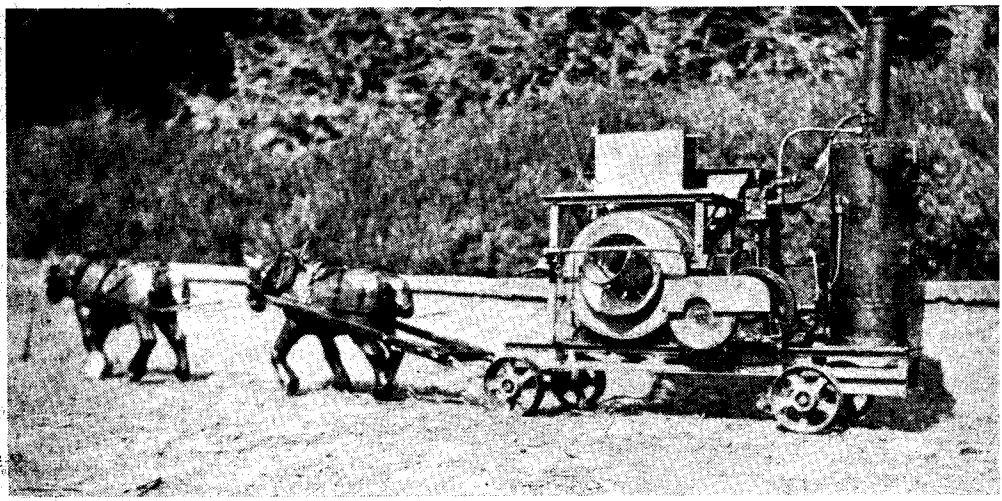
Another photograph shows a model of a 12 nominal h.p. Marshall Compound Portable. For this I used the cylinder castings of the small " M.E." Undertype which I had by me since about 1913.

The last photograph shows a model that was at THE MODEL ENGINEER Exhibition in 1930 and is now fitted with a smaller boiler than the original, but this gives ample power and, I believe, a better appearance.

I have enjoyed the " Hunting Traction Engine " articles. Last summer I did some hunting for Portables with my camera and got some interesting photographs, among which was one of a portable built in 1862 though, unfortunately, the engine was hardly visible for the weeds which



Model of a 12 n.h.p. Marshall compound portable, driving circular saw and mortar mill—hand derrick in background

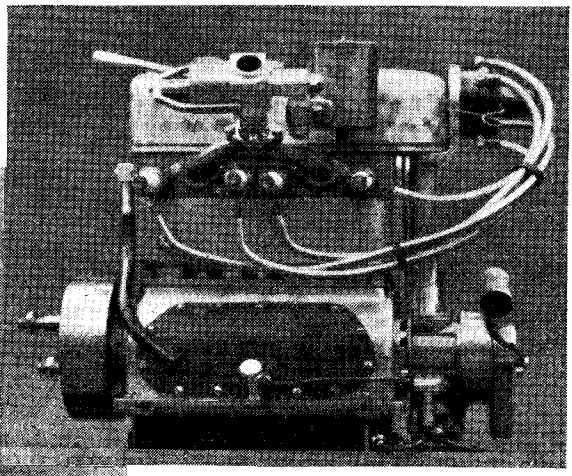


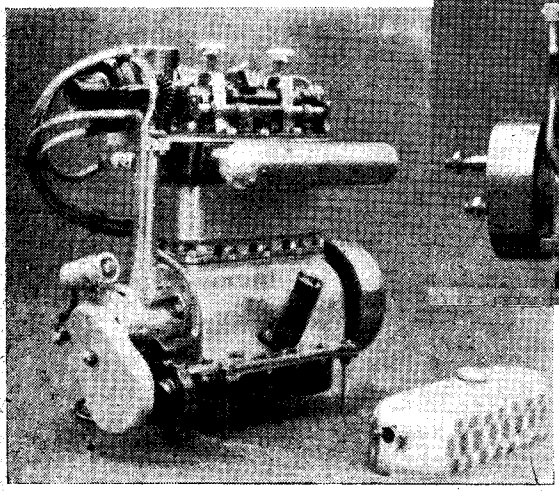
A model Stothert and Pitt type concrete mixer, steam-driven, moving to a new job

had grown round it. The owners told me that they hope to do it up later on when conditions allow, as it was their first engine when they started business.

A Stolen Petrol Engine

THE idea that public morality seems to be deteriorating nowadays is apparently confirmed by the many reports which we receive regarding thefts of models. One of the latest of these reports concerns a model 4-cylinder petrol engine built by Mr. H. R. Puntis, a well-known member of the Southampton Model Power Boat Club. This very fine model was described in the issue of THE MODEL ENGINEER dated March 8th, 1945, but to assist identification, we publish





two photographs of it herewith, in case any of our readers may see an engine answering to this description offered for sale, in which case we should be obliged if they would communicate direct with Mr. Puntis, at Shenebar, Oakley Road, Southampton.

Editor's Correspondence

Traction Engines—An Appeal

DEAR SIR,—A friend of mine and I are ardent traction engine "fans," especially the old steam ploughing engines, manufactured until about 1930 by John Fowler Ltd., Leeds.

We, in this locality are rather fortunate of late, we have found a pair of Fowler's ploughing engines lying dormant in a field, and literally corroding away.

The right-hand engine has been partially smashed (sledge-hammer smashed) by some firm of scrap-dealers, and then apparently given up as a bad job.

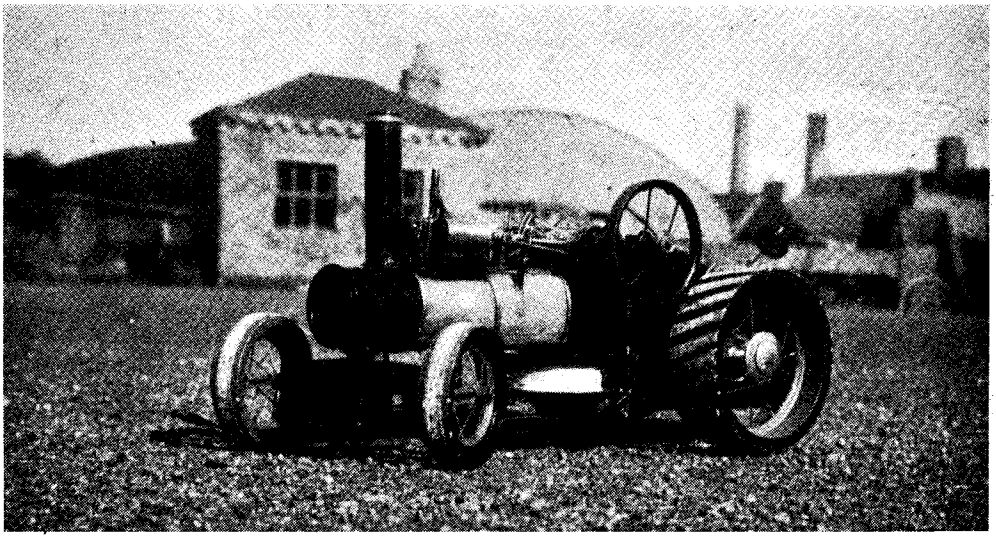
The left-hand engine is, however, in more or less good condition, and except for requiring a few minor repairs, appears, workable. They are both compounds, single-crosshead, slide-bar type, built around 1920.

These engines have furnished us with a wealth of detail and information and we have now decided to build a pair of these engines (right-hand and left-hand) to 2 in. scale. We have got as far as building the two boilers at present, 22 in. long by 5 in. diameter.

We know, also, of a farmer within 10 miles of us, who regularly uses a pair of these engines for all his ploughing, etc., "having no time for tractors," as he puts it.

The reproduced photograph shows a model of a Fowler's Compound ploughing engine, which I built some months ago. Although is has a dummy (wooden) boiler and firebox, the rest of the engine works by steam from a stationary boiler, in this case, a 2-gallon petrol can on a gas-ring. It is a compound engine, with link motion, regulator and "button" to low-pressure cylinder. The rear wheels are 10 in. × 3 in. and the front, 5½ in. × 2 in., and it stands about 18 in. high. It was constructed entirely of odds and ends. It is the "right-hand" engine, and actually rotates the winding drum (seen beneath the boiler) in reverse gear only, as the right-hand engine should.

Yours faithfully,
Nuneaton. T. ISON.



Treadle Design

DEAR SIR,—I was interested in the treadle design brought to our notice by Mr. K. N. Harris some weeks ago and by the correspondence which has followed. It struck me that the reason for the design might be as follows.

Assuming a flywheel without balance-weights, the weight of the usual treadle and pitman would cause the crank to come to rest at B.D.C. Starting could only be done by pulling round with the belt until the crank was in a more advantageous position for treadling.

With the unusual type, the crank would come to rest slightly before B.D.C., but in this case the pitman, being more or less horizontal, starting can be made straight away by treadling without any manipulation of the belt. This design has also the good feature of a long-stroke crank.

In conclusion, I would echo Mr. Harris's wish to see Mr. Dyer back as a contributor. I enjoyed his articles with his lucid sketches and drawings and his clear step-by-step instructions. I have both his handbooks on sheet metal and repair work, and can recommend them to both beginners and experienced for their comprehensiveness.

Yours faithfully,
Camberley. J. B. SHEARLAW.